Middle Tennessee Electric

27kV and 38kV Circuit Breaker Design and Construction Specifications RFP

February 2006

Middle Tennessee Electric
555 New Salem Highway, Murfreesboro, TN 37129
1.877.777.9020 / www.MTE.com

February 20, 2026

Subject: 2026 – 27kV and 38 kV Circuit Breaker RFP

To Whom It May Concern:

You are invited to submit bids to design, procure, and construct 27kV, 1200A, "Standard" and "Special CT" Substation AC Circuit Breakers, and 38 kV, 2000A Substation AC Circuit Breakers, as required by MTE. Proposals should include a firm price. The attached 27kV and 38kV Circuit Breaker specification documents detail the requirements, including a delivery schedule, quantities, technical details, and penalties for non-compliance, if applicable. MTE will open the bids at 1:30 PM, **Friday, March 13, 2026**. Email your proposal in electronic format to the email address below before the specified time (hard copies are not required). Bid submittals after the specified time will not be accepted and marked late.

Bid submittals require completing Appendix A and Appendix B of this RFP. There is to be one section of the proposal that is labeled "Exceptions." The "Exceptions" section of the proposal includes any items the Bidder is proposing to not follow in the specifications. MTE will evaluate each "Exception" on its merit. If the "Exception" is not explicitly approved in writing, the Manufacturer **must** follow the MTE specification. Additionally, the bid submittal shall include the proposed Bill of Materials, drawings, applicable performance data, suggested spares parts and associated price, and any other pertinent details required to evaluate the Bidder's offering.

MTE management, in its sole discretion, shall determine the best bid under all circumstances, which reserves for MTE the right to reject the low bid if deemed not to be the best bid or in the best interest of MTE. MTE reserves the right to reject any submittal(s). Each of the three proposals may be awarded independently and each submittal should not be contingent upon any other submittal; however, if a discount is offered for awarding all three proposals, you may state that as a separate discount. If you choose not to bid, return a copy of this letter before the bid date indicating you will not be submitting a bid, in order to receive consideration for future RFP's.

If you have any questions, don't hesitate to get in touch with me at 615-494-1526 or clivebuttrey@mte.com.

Sincerely,

Clive W. Buttrey Jr., P.E.
Substation, Metering, and Apparatus Manager
Middle Tennessee Electric
555 New Salem Road
Murfreesboro, TN 37129

Initial_____No Bid

MIDDLE TENNESSEE ELECTRIC

SPECIFICATIONS FOR
OUTDOOR SUBSTATION CIRCUIT BREAKER, 38 kV, MTE FRANKLIN PROJECT

1. SCOPE

The bid is for three (3) breakers to be supplied to MTE. The bidder will also quote recommended spare parts, such as control boards, auxiliary control decks, relays, and energy storage devices such as capacitors. The breakers may be magnetic-actuated or spring-charged. Circuit breakers containing hydraulic motors, pumps, etc. will not be accepted.

2. GENERAL REQUIREMENTS

2.1 The breakers will be located in a 161kV to 26kV Substation. They will be connected Y-Y in a grounded Y system.

2.2 The breaker shall be fully operational for outdoor operation and in ambient temperature range of -30 degrees Celsius to +40 degrees Celsius.

2.3 The peak instantaneous sound pressure level of the circuit breaker when operated at no load to open or close the three poles simultaneously shall not exceed 130 dB. The impulse rms sound level shall not exceed 100 dB in the far field. The measurements shall be in accordance with ANSI/IEEE C37.082 latest edition.

2.4 Circuit breaker appurtenances such as current transformers and potential devices shall not reduce the circuit breaker insulation level below the specified BIL.

2.5 The entire breaker assembly shall be designed and constructed for Seismic Zone 1 conditions per the latest UBC Edition, 100 mph wind velocity per ASCE 7, and a Heavy loading NESC District.

2.6 Bushings shall be Piedmont 38 kV polymer bushings, part # 402026-K04, or equivalent.

2.7 The breaker shall meet or exceed the following ratings:

1. 38kV maximum continuous voltage, RMS at 60 Hz
2. 200kV crest, impulse level withstand voltage (BIL)
3. 2000 A RMS, continuous current
4. 25,000 A RMS, symmetrical interrupting current
5. 65,000 A peak, closing and latching current
6. 5 cycle or less rated interrupting time

2.8 Maximum reclosing times with zero time delay between reclosures shall be as follows:

	Preferred (cycles)	Acceptable (cycles)
First reclosure	20	20
	(shall be adjustable down to 15 cycles)	
Second reclosure*	20	30
Third reclosure*	20	30

*Not applicable with spring mechanism

Bidders not able to meet the above reclosing times may submit bids with alternative values that will be considered and evaluated.

3. STANDARDS

All applicable standards issued by IEEE, ANSI, and ASME, including but not limited to the ANSI/IEEE C37 Series, shall be followed in the design and manufacture of the breakers unless stated otherwise in this document. The breakers and all components shall be new and without defect.

4. OPERATING MECHANISM

4.1 The poles of the circuit breaker shall be mechanically linked together and operated by a common mechanism.

4.2 The operating mechanism shall be made of corrosion resisting materials, and all bearings requiring grease shall be equipped with pressure-type grease fittings when applicable.

4.3 All materials, connections, and parts subject to wear shall be designed and manufactured such that the loosening or changing of adjustment with repeated operation of the circuit breaker will be prevented.

4.4 The tripping and closing mechanism and associated accessories shall be enclosed in one or more weatherproof mechanism housings having hinged doors as required to give adequate access for operation and maintenance of the mechanism or accessory.

4.5 One or more thermostatically controlled space heaters (240 VAC **wired for 120V operation**) shall be installed in each mechanism housing to prevent condensation, and provide for satisfactory operation for ambient temperature of 25 degrees below zero Fahrenheit at 120V operation.

4.6 The mechanism shall be non-pumping. It shall be trip-free electrically and mechanically in accordance with ANSI/IEEE C37.100 latest edition under every method of closing specified herein, except for manual closing by means of a jacking mechanism when such is provided. On puffer breakers, closing must always be completed before opening starts.

4.7 A conveniently located manual or electrical tripping device shall be provided for tripping the breaker either mechanically or electrically while simultaneously opening the reclosing circuit. It shall be so arranged that the breaker can be tripped without opening the mechanism housing, and the housing must be opened before the reclosing circuit can be reset. Alternate arrangements will be considered and evaluated.

4.8 The bidder must have five or more years of manufacturing experience with the mechanism quoted.

4.9 Vacuum shall be used for interrupting.

5. STRUCTURAL FEATURES

5.1 The position indicator specified in ANSI/IEEE C37.12 latest edition shall be visible with the mechanism housing closed and readable to a person standing on the ground.

5.2 The breaker enclosure shall be arc resistant to protect from fault or weather damage.

5.3 ***The topmost section of the breaker shall have a grounding tab to accommodate proper grounding. This grounding tab shall not compromise the clearance of the bushings. A ground connection shall be made from the main grounding tab to the tab on the topmost section.***

5.4 The breaker enclosure shall meet NEMA 3R standards and pass rain testing per ANSI C37.20.2 latest edition.

5.5 All external hardware shall be stainless steel.

5.6 Outer enclosure doors shall use a three (3) point latch system that will accommodate a padlock. Doors shall have a 120 degree swing with a hold open. Grounding straps shall be connected from the main cabinet to the doors.

5.7 Interior swing doors shall use a quarter-turn latch system. Doors shall have a 120 degree swing with a hold open.

5.8 High voltage compartment shall be provided to isolate high voltage components from secondary control devices.

5.9 A removeable plate shall be provided in the bottom of the mechanism hosuing. The plate shall be of sufficient size as ot allow MTE to drill within an 8” by 8” area during installation to receive rigid conduit. The removeable plate shall be placed in an area such that incoming cables do not interfere with the functionality or operation of the breaker (i.e. interior swing panel movement, too close to space heater, etc.).

5.10 Drains and vents, if used, shall be covered with corrosion-resisting screens.

5.11 The breaker shall be painted ANSI 70 (Sky Gray) or ANSI 61 in color.

5.12 The breaker frame shall be mounted to a single foundation.

5.13 The breaker casing shall be made with welded connections only, no bolted connections will be allowed between parts of the outer casing.

6. INCORPORATED SECONDARY AND CONTROL DEVICES

6.1 The control voltage for the circuit breaker shall be 125 VDC.

6.2 A 120 VAC light, with lumen output not less than that of a 75 watt incandescent lamp, and 120 VAC duplex convenience outlet, rated 15 amps, shall be located in the mechanism housing. The light shall be controlled by a switch activated when the door to the mechanism housing is opened.

6.3 All internal wiring of the control circuits shall not be less than #14 AWG stranded copper wire. There shall be no inline splices. All connecting blocks in which the end user may attach to shall be GE # EB25 Terminal Blocks for general use, and GE # EB27 Shorting Terminal Blocks for use on CT circuits and other locations when required.

6.4 All wiring shall be permanently labeled using a “To/From-Wire name” method (e.g. 1AA-15/T+). Panduit LJSL series or equivalent labels shall be used.

6.5 All fuses shall be class H, one time, in accordance with NEMA FU-1.

6.6 The control circuit shall contain one closing control X-relay and one closing cutoff Y-relay to provide electrically trip-free and nonpumping breaker control. The Y-relay coil circuit shall be capable to withstanding continuous excitation without injury. If approved by MTE, a control circuit with devices functionally equivalent to the X- and Y- relay circuit described above may be furnished.

6.7 A minimum of eight contacts (four "a" contacts and four "b" contacts) shall be provided for the user. The user connection point shall be a terminal block that is readily accessible.

6.8 The circuit breaker shall have two (2) sets of multi-ratio 3000/5 class C400 current transformers for relaying, one current transformer per bushing. Shorting type terminal strips for each current transformer shall be provided at a readily accessible location in the mechanism housing. The wire size from the CT's to the terminal strips shall be a minimum twelve gauge stranded copper. There shall be no inline splices. All CT wiring shall be a minimum of twelve gauge stranded copper.

6.9 A relay shall be provided for a loss of DC alarm. This can be provided through the Schweitzer SEL-351S relay as specified below.

6.10 Both CT circuits are to contain G.E. six pole PK-2 blocks. These PK blocks are to be located on the front swing panel of the control cabinet. One PK block will be for the substation differential circuit. The other PK Block is to be used to shunt the SEL 351S relay on other CT circuit. ***The relay side of the substation differential circuit PK-2 block shall be wired to terminal block points for ease of field connections.***

6.11 The PT circuit is to contain a G.E. four pole PK-2 block. The PK block is to be located on the front swing panel of the control cabinet. The PK block will be for the SEL relay voltage inputs. ***The source side of the PT circuit PK-2 block shall be wired to terminal block points for ease of field connections.*** Additionally, the SEL relay voltage inputs shall be fused with 250V, 5 amp fuses.

6.12 Relaying to consist of one Schweitzer SEL-351S unit, with direct connect breaker control buttons. The relay is to be SEL “0351S6X4D4J54X1, key 7501” (with hot TRIP and CLOSE buttons to be included).

6.13 The relay CLOSE pushbutton shall not effect direct control of the breaker; instead it shall be wired to IN102 of the SEL relay so that the relay may supervise closing action.

6.14 The relay TRIP pushbutton shall be wired to directly trip the breaker in the event of the SEL relay failure.

6.15 Any other applicable alarms (control board failure, spring charge failure) shall be wired to remaining inputs (IN103-IN107) and noted on submitted approval drawings. Please see attached example drawing for how to wire the remaining inputs.

7. TESTING

7.1 Each design of a circuit breaker or significant change in design shall be tested in accordance to ANSI/IEEE C37.09 latest edition. The Manufacturer shall furnish MTE certified results of the design test, and whether the tests were on MTE's circuit breaker or on a breaker of similar design.

7.2 All applicable production tests included in ANSI/IEEE C37.09 latest edition shall be made on each circuit breaker. A minimum of 25 operations shall be performed on the breaker after complete assembly to assure the breaker is functioning properly. MTE shall be notified a minimum of seven (7) days in advance of testing so that a representative of MTE, at its own discretion, may observe the test and inspect the breaker before shipping. Certified test results shall be provided to MTE by the Manufacturer prior to shipping.

7.3 Defective equipment or equipment damaged in testing shall be replaced at the expense of the Manufacturer and the appropriate test shall be performed again to verify proper function.

8. INFORMATION TO BE FURNISHED BY BIDDER OR VENDOR WITH BID

All bidders shall return to MTE all the information specified in Appendix A and Appendix B. Bidders may also provide any additional information that they feel will assist MTE when evaluating their respective breaker. All data provided shall be obtained by following the appropriate ANSI/IEEE and ASME standards.

9. INFORMATION TO BE FURNISHED BY SUCCESSFUL BIDDER ONLY

9.1 Three sets of Approval Drawings shall be provided to MTE before the manufacture of the breaker. One set will be returned to the manufacturer. Approval by MTE shall not relieve the contractor of the responsibility for the correctness of the drawings furnished by the contractor nor the compliance with the specifications, unless so stated by MTE at the time of approval.

9.2 One complete set of all drawings, wiring diagrams, descriptive data, instruction sheets, and manuals pertaining to each breaker and all associated equipment shall be shipped with each breaker.

9.3 One electronic copy of all drawings, wiring diagrams, descriptive data, instruction sheets, and manuals pertaining to each breaker and all associated equipment shall be provided to the MTE Central Office Engineering prior to shipping. All drawings shall be provided in Autocad .dwg format.

10. SHIPPING AND HANDLING

The Operations Department of MTE shall be notified a minimum of 48 hours before shipping of the breakers. Failure to give notice of delivery will result in delays in unloading the breakers. Delivery to be made on an open flat bed truck. The Manufacturer will be responsible for any excess cost do to a failure to notify 48 hours prior to shipping. Acceptable delivery times are between 7:30 AM to 12:00 PM and 1:00 PM to 3:00 PM on normal business days. Equipment delivery shall be F.O.B site as specified. MTE will unload and designate area for unloading.

The equipment and all components shall be completely assembled before shipment. Manufacturer shall prepare all items for shipment in a manner to protect them from damage in transit. Manufacturer assumes all liability for equipment during shipping and shall repair or replace items damaged during shipping.

The tentative delivery address is shown below:

MTE Warehouse
1007 Industrial Dr.
Murfreesboro, TN, 37129

11. EXCEPTIONS

Any exceptions to this specification shall be stated in writing in a clearly defined section labeled “Exceptions” when the bid is submitted to MTE.

12. WARRANTY

Manufacturer shall warranty circuit breaker, including all equipment and work performed, against defects in material and workmanship for a period of five (5) years after successfully put in service (not to exceed five and one-half (5.5) years after delivery).

13. DELIVERY SCHEDULE

MTE will take delivery at the manufacturer's earliest availability.

APPENDIX A – 38 kV

A1. Manufacturer _____

A2. Model _____

A3. Bid Price including freight prepaid FOB to destination in Appendix A _____

A4. Delivery time after receipt of order _____

A5. Interrupting Mechanism/Bottle _____

a) quantity required per breaker _____

b) current replacement price per unit _____

A6. List of recommended replacement parts _____

_____

_____

_____

Price of recommended replacement parts _____

_____

_____

_____

A7. Material and thickness of tank wall (inches) _____

A8. Contact material _____

a) Length of contact travel (inches) _____

b) Number of breaks in the interrupter _____

c) Length of each break (inches) _____

d) Contact force (pounds) _____

e) Normal contact resistance (ohms) _____

f) Maximum allowable contact resistance (ohms) _____

A9. Bushing information

a) bushing voltage rating (kV) _____

b) bushing current rating (kA) _____

c) 10-second wet withstand voltage at 60 hertz _____

d) 1-minute dry withstand voltage, kV crest _____

e) creepage, inches _____

f) manufacturer and type _____

A10. Extent of disassembly required for shipment _____

A11. Maximum noise level in dB per C37.082

a) near field (peak instantaneous sound pressure) _____

b) far field (impulse rms sound) _____

A12. Magnetic-actuated or spring closing mechanism _____

a) rated horsepower of charging motor _____

b) charging motor current at rated horsepower

i) starting _____

ii) running _____

c) Manufacturing years experience with mechanism _____

A13. Minimum tripping and closing voltage _____

A14. Closing current at 105 VDC and 125 VDC _____

Tripping current at 105 VDC and 125 VDC _____

A15. Breaker weight

a) net weight of breaker with gas (pounds) _____

b) shipping weight of breaker, less gas (pounds) _____

c) foundation loading information _____

A16. Overall width, length, height, and phase spacing. A sketch would be preferred for this information. Also include any additional space required needed for maintenance and repair such as bushing or interrupter replacement.

APPENDIX B – 38 kV

GUARANTEED PERFORMANCE DATA

B1. Circuit Breaker Ratings and Capabilities

a) low-frequency withstand voltage(rms kV) _____

b) full-wave impulse withstand voltage (crest kV) _____

c) continuous 60 Hz current rating (kA) _____

d) closing & latching current rating (kA) _____

e) short-time (3 sec) current rating (kA) _____

f) short circuit interrupting rating (kA) _____

g) contact parting time upon which interrupting rating is based, cycles _____

B2. Rated short-circuit current based on ANSI duty cycle of CO + 15 sec + CO at rated maximum voltage (kA) _____

B3. Maximum symmetrical current interrupting capability based on ANSI duty cycle of CO + 15 sec at 1/K times rated maximum voltage _____

B4. Symmetrical current interrupting capability, at rated maximum voltage based on the ____ following duty cycle, (kA)

O + 0 sec + CO _____

O + 0 sec + CO + 0 sec + CO _____

O + 0 sec + CO + 0 sec + CO + 0 sec + CO _____

O + 0 sec + CO + 15 sec + CO _____

O + 0 sec + CO + 0 sec + CO + 15 sec + CO _____

O + 0 sec + CO + 15 sec + CO + 15 sec + CO _____

B5. Interrupting time with normal control voltage applied (cycles)

a) at 25 % to 100 % interrupting rating _____

b) at less than 25 % interrupting rating _____

B6. Reclosing time with rated control voltage and with normal energy storage at beginning on the of the first recloser (cycles)

a) first reclosure _____

b) second reclosure _____

c) third reclosure _____

B7. The number of mechanical operations the breaker may experience at full rated load before maintenance is recommended. _____

B8. The number of full fault operations the breaker may experience before maintenance is recommended. _____

The undersigned bidder hereby guarantees that the operating performance of each breaker type and rating offered above, under this proposal, will be at least as good as indicated in the list above. Information furnished shall be on the symmetrical basis of rating, ANSI/IEEE C37.06.

_____

BIDDER