

# EXHIBIT B – 230KV Motor Operated Switch Specifications

This specification covers the design and manufacture of three pole, gang operated vertical break air disconnect switches rated 245 kV, 1200 A continuous current.

- **STANDARDS**

- The vertical break air disconnect switches shall be designed and furnished in accordance with the latest applicable sections of ANSI C37 series standards, NEMA standard SG6, and ASTM standards A-123 and A-153. Equipment designed to IEC standards is not acceptable.

- **DESIGN REQUIREMENTS**

- **Service Conditions**

- The disconnect switches shall be suitable for outdoor installation under the following conditions:
  - Temperature
    - The disconnect switch shall perform in an ambient temperature range of -50°C through +50°C.
  - Altitude
    - The disconnect switch shall perform at elevations up to 3,300 feet.
  - Seismic
    - Determined by customer specific requirements.
  - Wind Loading
    - The disconnect switch shall be capable of withstanding wind loads up to 90 mph without loss of function.
  - Ice
    - The disconnect switch shall be capable of operating in ¾" ice.

- **ADDITIONAL REQUIREMENTS**

- If any site-specific service conditions not covered in section "Service Conditions" exists (e.g. extreme cold temperature installation, corrosive environment, high altitude installation, etc.) they will be defined in the quotation request.

- **Ratings**

- **Electrical**

Maximum Voltage	245 kV
BIL	900 kV
Continuous Current	1200 A
Rated Short Time (3 sec) Withstand, Peak Withstand	1200 A – 40 kA (3 sec), 99 kA peak
Temperature Rise	53°C rise over 40°C ambient (ANSI) – ACCC D06
Number of Mechanical Operations	1000

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- **Source Supply Voltage**

1. Motor Voltage 125 VDC
2. Auxiliary Voltage 120V, 60 Hz, 1 ·
3. Control Voltage 125 VDC

- **Operating Mechanism**

- The operating mechanism will be a motor operator. The maximum operating force to open or close the switch when using a swing handle operator shall be 50 lbs. force exerted at the end of a 3-foot effective length handle. Acceptable handle lengths are 12, 15, or 18 inch. The operating mechanism shall be capable of being padlocked in both the open and the closed position. Operating mechanism interphase pipe shall include rapid set threaded extrusion clevis, self-piercing design for finite adjustment within the switch interphase pipe and linkage, U-Bolt Clevis is not acceptable on the interphase pipe.

4. Operating Time 4 to 6 sec.

- **Vertical Operating Pipe**

- The vertical operating pipe shall be sized as required by Manufacturer to accommodate the specific installation requirements and shall be supported every 15 feet with a pipe guide to prevent pipe deflection.

- **SWITCH BASES**

- The switch bases shall be structural steel, hot dip galvanized. Double channel bases will be furnished. The centerline-to-centerline distance between the base mounting holes across the width of the switch bases shall be 8-¼ inches. Tubular bases are not acceptable.

- **Bearings**

- The rotating insulator stack bearings will be either stainless steel ball type or sealed automotive ball type. The outboard bearing will be a high molecular weight polyethylene bushing or stainless-steel ball type. All bearings must be maintenance free.

- **Jacking Bolts**

- Jacking bolts shall be provided to level all insulator stacks, including rotating stacks. Shims are not acceptable.

- **Terminal Pads**

- Terminal pads shall be un-plated aluminum, three sided to allow for

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multiple terminal locations.

- **Construction**  
Terminal pads shall be extruded aluminum U shaped channel. All three sides must be finished on the top surface and provide at least a 4-hole connection to affect a smooth connection point for terminal connectors to transfer current. Formed copper plate is not acceptable.
- **Drilling**  
The terminal pads shall have NEMA hole spacing of 1 ¾ inches x 1 ¾ inches and shall have:
  - 4 holes
- **Terminal Connectors**
  - Ocala Electric Utility will supply terminal connectors.
- **Counterbalances**
  - All main switch blades shall be counterbalanced to prevent them from falling closed when the switches are mounted horizontally upright and to reduce the operating effort required to open or close the switches when the switches are mounted in any position. All counterbalance springs shall be enclosed in a metallic tube for protection, exposed springs are not acceptable.
  - Plastic is not an acceptable material for a counterbalance housing. Counterbalances shall be designed such that they can be removed in the field without disassembling other portions of the disconnect switch.
- **Contacts**
  - All contact fingers shall be copper and of the reverse loop type so that during short circuit conditions the reverse loop design produces high levels of opposing magnetic force in close proximity to each other. These opposing magnetic fields will tend to increase contact pressure and hold the blade in the closed position. The current transfer surfaces on the contact fingers will consist of brazed silver inserts with a minimum of 10 mils silver. All contact fingers shall be individually adjustable and field replaceable. The contact fingers will be backed by stainless steel springs which are outside of the current path. Make/break contacts shall be silver to silver.
- **Hinge End Current Transfer**

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- Current transfer on the hinge end of the disconnect switches shall be accomplished via either a sealed threaded hinge with silver to copper current transfer surfaces or reverse loop contact fingers with silver-to-silver current transfer surfaces. Current transfer via welded laminated shunts or braided shunts is not acceptable. No current shall be transferred through springs, bolts, or other hardware.
- **Switch Blades**
  - The switch blades shall be tubular aluminum with brazed silver current transfer surfaces. Switch blades shall be fully rated to carry the continuous current rating shown on the nameplate. Anodized aluminum blades are not acceptable.
  - Switch blades shall have a rotating motion upon opening and closing to release contact pressure, to wipe the stationary jaw contacts clean of any contaminants, and to break any accumulated ice build-up. Blade tips shall be machined to accept tin plated copper contact bar. Contact bar shall have 43 mils silver brazed on both sides. Collapsing the end of the switch blade in order to attach contact bar is unacceptable.
- **Arcing Horns**
  - Switches shall be furnished with standard arcing horns.
- **Insulators**
  - 5-inch bolt circle (B.C.) insulators shall be furnished. All insulators will be ANSI 70 light gray in color. Switches shall be shipped with the switch live parts assembled to the switch bases and the insulators shipped packaged separately.
- **DESIGN TESTS**
  - The disconnect switch shall be design tested in accordance with ANSI C37.32.
- **PRODUCTION TESTS**
  - Each disconnect switch shall be assembled as a single-phase unit at the factory, with insulators, adjusted, and final test completed.

The minimal tests shall include:

- **Mechanical Operation**
  - Open and Close checks shall be performed.

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- Resistance Tests
- Current Path Resistance Test
  - A terminal-to-terminal micro-ohm resistance check shall be performed on each interrupter using a 100 A DC source and the values shall be recorded.
- **SWITCH INSTALLATION and MAINTENANCE**
  - Special Tools
    - No special tools shall be required to assemble and install the disconnect switches.
  - Spare Parts
    - No spare parts shall be required to be purchased at the time of disconnect switch purchase. Stock shall be maintained at the manufacturer available for rush shipment in the event of an emergency need.
- **DOCUMENTATION REQUIREMENTS**
  - Structure Details
    - Two sets Switches will be replacing old hand crank switches horizontally mounted on a steel frame measuring 25' x 10.5'. The other two sets of switches will be horizontally mounted on a existing steel frame measuring 33.25' x 6.75'. Phase spacing of the switches on the request to allow the manufacturer to custom design the operating mechanism arrangement to fit the specific structure. Phase spacing no greater than 16'. Both switches will be horizontally mounted no higher than 25'.
- **ADDITIONAL REQUIREMENTS:**
  - Operations counter
  - Position indicating lights
  - Extra auxiliary switches (total of 22)
  - Cabinet heater
  - Fused knife switches
  - Cabinet ground lug and grounding bar
  - Cabinet light with door actuated switch

## EXHIBIT B – 230KV Motor Operated Switch Specifications

- Approval Drawings

Approval drawings are required and shall be emailed to

[RWhitehead@ocalafl.gov](mailto:RWhitehead@ocalafl.gov), [MOcull@ocalafl.gov](mailto:MOcull@ocalafl.gov) & [LCrouthamel@ocalafl.gov](mailto:LCrouthamel@ocalafl.gov).

The manufacturer shall furnish approval drawings in AutoCAD .DWG and .PDF format via e-mail. If there are no comments to the approval drawings OEU will respond via e-mail that drawings are approved as submitted with no changes. If comments are required then one copy of the drawings will be returned to the manufacturer within 10 days from the date of transmittal marked "approved with comments as noted".

- Final Drawings

The manufacturer shall furnish final drawings in AutoCAD .DWG and .PDF format via e-mail. Unless otherwise specified in the purchase order, the final drawings will be forwarded to the same individual as the approval drawings.

- Instruction Books

The manufacturer shall furnish an electronic copy of each applicable instruction book in Adobe Acrobat .PDF format via e-mail. The instruction book(s) will be forwarded to the same individual as the approval drawings.

- Additional Documentation

One complete set of final drawings and one copy of each applicable instruction book shall be shipped in a weatherproof envelope with each disconnect switch.

- **SHIPPING and DELIVERY**

The disconnect switch shall be in sturdy wooden crates that provides protection from all side. Bracing across the terminal pads only is not acceptable. Crates should be configured to enable easy access and lifting with a forklift. Offloading will be responsibility of OEU.