MSOD/T Series
MOTOR SWITCH OPERATOR
FOR RECIPROCATING (⇧⇩) SWITCHES
ENGINEERING SPECIFICATION

Scope: This material description covers the minimum acceptable requirements for 4 kV-138 kV G.O.A.B. reciprocating switch controllers and stored energy operators. The switch controller is to be mounted below the switch assembly. The controller shall be able to accommodate the various applications, including, but not limited to:

- Encrypted, secured and codable 900 MHz handheld remote control.
- External S.C.A.D.A. with, or without current or current/voltage sensors or remote faulted circuit indicators via RTU and radio or other communication media of the customer's choice, through a bulkhead receptacle.

Mechanical and manual operation

- The switch operator must be designed to open and close all the types of manufacturers' reciprocating switches of sufficient force in 0.5 to 0.7 seconds.
- The operating mechanism and enclosure must be G.O.-95 compliant.
- All linkage components are to be of nonferrous anticorrosive materials and be physically and be environmentally isolated from the electronic components by a bulkhead.
- Means shall be provided to enable the motor to be coupled or decoupled from the output linkage in any position without realigning the motor linkage to the output shaft or repositioning the output linkage to its original position prior to manual operation.
- Switch position status is to be indicated when operated either by motor or when operated manually.
- A motor de-energizing interlock, physical linkage stop in a padlockable collar are to be provided for clearance point verification.
- The operator enclosure is to be of welded NEMA 4X construction of 14 gauge, stainless steel with ANSI 71grey powder-coated 3 mil. minimum.
- A thermostatically controlled heater shall be provided to reduce condensation in the operator.
- The operator enclosure shall be a maximum of 16 inches wide for traffic and pedestrian safety.
- All ferrous components and hardware shall be hot-dip galvanized per ASTM A123.

Controller:

- The operator controller must be easily replaceable and upgradeable, and provide a terminal block with 24 and 12 VDC power outputs for RTU with status and control points and communication devices.
- The operator controller, RTU and communication equipment are to be enclosed in a modular unit, which can be exchanged with a comparable module. Control module exchange and replacement shall be hot-swap capable, i.e. module can be replaced or removed for upgrade or repair without taking an outage.
- Control module exchange and replacement shall not require rewiring of the controller, analog inputs or the power supply.
- Controller shall be isolated by a separate control panel, to protect the user from inadvertent contact with energized parts. "Open" and "Close" switches shall be covered to prevent inadvertent accidental contact.
- Controller shall have the following points:

Status:	1.	Switch open	6.	Interlock pin removed (motor circuit disable)
	2.	Switch closed	7.	Low battery lockout
	3.	Local enabled	8.	Power supply fail
	4.	Remote enabled	9.	Door open (optional)
	5.	Manual mode (motor decoupled)	10.	Local and/or remote operations counter (optional)
Control:	1.	Open switch	3.	Battery test
	2.	Close switch	4.	Fault detect reset (optional)

Front Panel User Interface:

- Display/operation panel shall be hinged and latchable, and have the following attributes:

1. Panel displays:

   a) Battery test in progress lamp
   b) Low battery lockout lamp
   c) Power supply lamp
   d) Open pushbutton (covered & illuminated)

   e) Operator decoupled lamp
   f) Motor interlock pin removed lamp
   g) Cycle counter for switch operations
   h) Close pushbutton (covered & illuminated)

2. Provided controls:

   a) Lamp test pushbutton
   b) Battery test switch
   c) Battery reset switch
   d) Local/Remote toggle switch

   e) Open pushbutton (covered & illuminated)
   f) Close pushbutton (covered & illuminated)
   g) Motor decoupler
   h) Motor interlock

Power Supply:

- The power supply shall have the following minimum characteristics:

   Input voltage range: 110-240 VAC (50-60 Hz).
   Output current and voltage: 4.6/4 A, 24/28 VDC temperature compensating.
   Minimum switching frequency, 20 kHz, 1% peak-to-peak ripple.
   Inrush surge, EFT/burst, radiated susceptibility tested to: EN61000-4-2,3,4 and 5.
   Electromagnetic interference, conducted: FCC title 47, class B as applicable.
   The power supply is to be fused on both the input and output.

Motor and operation:

1. A 24 VDC sealed motor shall be powered by an easily replaceable 24 VDC/24 amp-hour maintenance-free, lead acid battery pack capable of sustaining 250 mA communication and RTU equipment for 36 hours, and four motor operations during the first 24 hours upon loss of the AC supply.
2. The motor shall be capable of being exercised via local control without effecting the switch position.
3. The motor is to be protected with thermal trip/reset breakers and overload torque limiting means to sense and reduce damage to iced or locked switches.
4. Motor contactors, relays, timers and battery management electronics shall prevent lazy or partial switch operation.

Documentation:

1. Each operator shall be supplied with an installation and operation manual that includes:
   - Remote and local control and manual operation.
   - RTU and radio installation.
2. Factory acceptance test certificates with associated serial numbers shall also be included.
3. All components shall be warranted the first year for on site repair of all parts and labor, and for an additional two years as returned to the factory. Warranty does not apply to battery replacement. RTUs and radios shall be warranted separately by their respective manufacturer(s).

The foregoing information is provided to help ensure specifying the highest possible quality motorized switch operator.

The information provided herein is intended solely as a guideline to create a specification that best suits the end user's application. Some portions may, or may not be applicable to your requirements and environment.

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