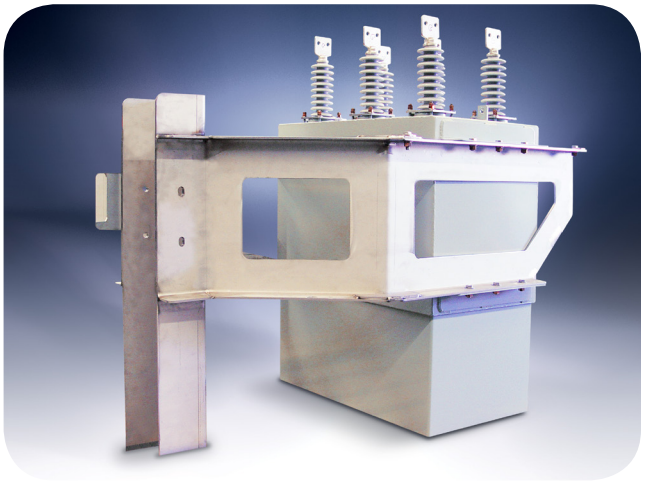
Trayer SWITCHGEAR

Grid Smart. Grid Tough.

ALTA Series

Storm-Hardened Overhead Vacuum Switch for Medium-Voltage Distribution Systems with SCADA Control

- Designed to Withstand Hurricane Conditions
- Welded 304 Stainless Steel Construction
- Field Replaceable Bushings
- Liquid Insulated, Motor Operated Vacuum Switch
- Provision for Lightning Arrestors on Each Bushing
- IP68 Control Cabinet with Battery Backup
- Safe and Secure Local Access and Control
- SEL Relay Switch Control



Trayer Engineering's ALTA Series storm-hardened, overhead medium-voltage vacuum switchgear is engineered for reliable operation under the most extreme environmental conditions. Designed for mounting on steel-reinforced, concrete poles, ALTA Series switchgear is equipped to withstand Category 5 hurricane strength winds, heavy rain, dust and debris.

The ALTA Series was engineered in response to the requirements of a coastal utility that suffered tremendous losses to its distribution equipment due to hurricanes in 2012. Each ALTA Series system is comprised of two units: a liquid-insulated, motor-operated vacuum switch, equipped with field-replaceable porcelain bushings, each with provision for lightning arrestors; and a control cabinet designed to meet IP68.

The control cabinet is designed to provide field access to local controls while complying with IP68 standards. Battery backup allows operation and remote interrogation of the switch under loss of system power. A gasketed cover provides access to the SEL relay. The relay is mounted on a hinged plate that in turn provides access to CT inputs, batteries, cabinet heater and SCADA communications.

Trayer Engineering is the recognized leader in tailoring its equipment to the specific demands of its customers. Trayer switchgear products are distinguished by their rugged, fully sealed and welded construction that enables decades of trouble-free operation. Trayer Switchgear units also feature the latest in advanced electronic controls, customizable for specific applications.

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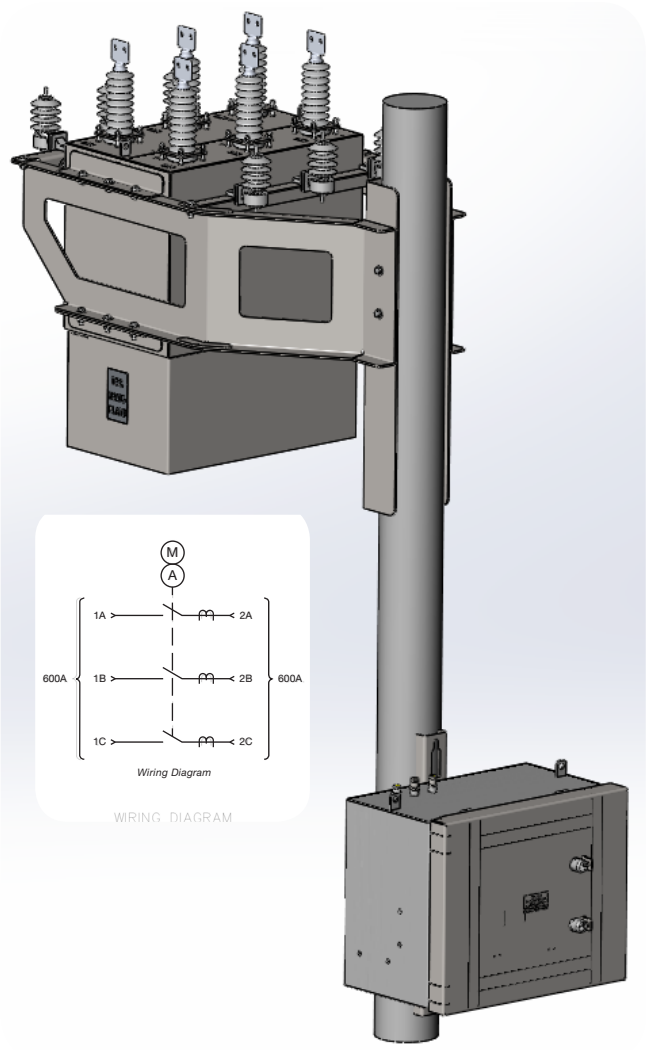
ALTA

Overhead Medium-Voltage Vacuum Switch

Switch Assembly

The switch assembly contains oil-insulated, motor-operated, vacuum load switches, CTs and control circuitry to interface with the control cabinet.

- Field-replaceable porcelain bushings held by custom developed, double locked sealing grommets
- Provision for lightning arrestors on each bushing
- Heavy-duty, 304 stainless steel mounting system
- Stainless steel skirt protects and covers linear actuator
- Internally mounted current transformers (CTs)
- Painted 304 stainless steel design excels in coastal and caustic environments
- Visible indication of switch position
- Linear actuator can be decoupled from switch handle to allow manual operation



Control Cabinet

The control cabinet features a gasketed outer panel designed to IP68 standards to protect the equipment - even if the unit should be submerged by flooding.

- Powered from user-supplied 120 VAC with battery backup
- Dual cover design protects sensitive relay and communications equipment
  - Outer security door prevents tampering
  - Inner bolted and gasketed panel protects the relay and other components
- Full perimeter, one-piece gasket ensures secure fitting
- Hinged inner panel access to CT inputs, batteries and SCADA electronics
- Heated cabinet to prevent condensation
- Pendant control access for field switch operation, eliminating the need to unbolt the gasketed cover.

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Storm Hardened Switchgear

The cost of repairing and replacing equipment following severe storms may exceed $10 billion for each season. The increase in floods, Category 4+ hurricanes, and other severe weather is necessitating the use of storm hardened equipment that is designed to return the grid to a functional condition, quickly restoring power to customers.

Five Storm-Hardening Design Elements

What exactly does it mean for a piece of electrical switchgear to be storm-hardened, and what does it take to achieve this level of performance? While no "official" classification yet exists for this category of switchgear, the working definition provided by one seasoned field engineer—"actions taken to secure a system against the ravages of unusually strong storms"—speaks to the need for ruggedizing equipment design, both mechanically and electrically, to withstand extreme environmental conditions while operating reliably over an extended service life.

In terms of severe weather impacts on the switchgear itself, the five essential hardening elements described below would provide similar levels of survivability for what Trayer Engineering calls "hurricane and inland storm-rated switchgear."

1 — ***Corrosion Resistance.*** Severe storms and corrosive environments necessitate the use of storm hardened equipment designed for long-term, sustainable operation. Trayer switchgear cabinets are made from corrosion-resistant 304 stainless steel.

2 — ***Welded Seam Construction and Hermetically Sealed Cavity.*** Welded seams provide greater integrity than bolted enclosures that are susceptible to water and particulate ingress through leakage as the equipment ages. Hermetic sealing prevents the loss of insulating mediums such as liquid and gas. Trayer switchgear cabinets are welded and sealed.

FEMA NEWS PHOTO

3 — ***Submersibility.*** All control panel componentry, such as SCADA controls and motor operators, must be able to survive adverse conditions, including storm flooding, Trayer storm-hardened control cabinets comply with IP68 rating.

4 — ***Robust Electrical Design.*** What goes on inside the tank effects the grid around it. Critical internal components, such as switches and interrupters, must be able to survive multiple concurrent fault and overcurrent conditions, such as those present in storms and natural disasters. Trayer switchgear utilizes high-performance vacuum load break switches.

5 — ***Safe Field Operation.*** Because line crews can't wait for a sunny day to go to work, it is imperative to simplify equipment as much as possible for dangerous conditions. Protecting the lives and well-being of the line crew operating high voltage equipment is crucial to the design of switchgear. Trayer switchgear is always designed for line crew safety and ease of operation.

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The Trayer Way

With 50 years of industry experience in medium voltage switching and fault interruption, Trayer has a sterling reputation for designing and building the toughest and smartest switchgear on the market. Trayer is a pioneer in vacuum breaker technology and continues to lead the industry with designs that meet the demands for highly reliable electrical grids. Plus, Trayer gear is noted for safety and ease-of-operation by linemen. That's why Trayer switchgear is specified by utilities around the globe. By combining excellent engineering with high quality manufacturing, backed up with a solid commitment to customer service, you can depend on Trayer Switchgear to perform for decade after decade.

Engineering Expertise. Using state-of-the-art CAD and software tools, Trayer engineers can design and model switchgear designs for plug-and-play replacement of industry standard configurations.

Quality and Craftsmanship. Trayer's advanced U.S. manufacturing facility utilizes the latest in fabrication and manufacturing technology. We take pride in the skill of our craftsmen who are experts in electrical, welding, electrical testing, and associated disciplines.

Customer Support. From the initial specification of switchgear through delivery, Trayer sales engineers will assist you through all stages of your switchgear project. From our extensive library of designs we can customize switchgear rapidly to your specific application.

Trayer Load Break Switch Ratings

	5/15 kV	25 kV	35 kV
Maximum Design Voltage (kV)	15.5	27	38
One Minute Withstand (kV @ 60 Hz)	34	40	50
Momentary Current 200 amp way (Bushing Dependent) (Asymmetrical Amps)	15,000	15,000	15,000
Momentary Current 600 amp way (Asymmetrical Amps)	20,000	20,000	20,000
Switch Only			
BIL Across Open Contacts (kV) 95 125 150			
BIL Phase-to-Phase and Phase-to-Ground (kV)	125	125	150
Load Switching (Amps)	600	600	600
Number of Full Load Operations	10,000	10,000	10,000
Continuous Current (Bushing Dependent) (Amps)	200/600	200/600	200/600
Maximum Interrupting Current (Three Shots) (Amps)	2,000	2,000	2,000

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