Engineered-Designed Vacuum Circuit Breaker Switch Houses

Line Power
Line Power Corporate Overview

Line Power is a division of Electro-Mechanical Corporation, a privately held, American-owned company founded in 1958. It is headquartered in Bristol, Virginia (USA) and for more than 60 years has manufactured a wide variety of products used in the generation, transmission, distribution and control of electricity. These products, along with various electrical equipment repair and maintenance services, are used by a diverse mix of Energy (coal, oil and gas), Electric Utility and Industrial customers worldwide.

Electro-Mechanical Corporation has earned a “customer oriented” reputation by keeping its focus on providing the best value to its customers through quality products and services. With six manufacturing companies and two repair and service companies, Electro-Mechanical Corporation has over 650,000 square feet of modern manufacturing facilities, located in Virginia and Mexico.

The Electro-Mechanical Corporation consists of:

**Federal Pacific** - Dry-type transformers from .050 KVA through 10,000 KVA single and three phase, up to 25 kV, 110 kV BIL with UL® approval through 15 kV; Vacuum pressure impregnation and vacuum pressure encapsulation. Medium voltage switchgear including air-insulated live-front, dead-front, SCADA-controlled, automatic transfer, primary metering and wall-mounted pad-mounted and metal-enclosed switchgear. ISO9001:2015 Registered.

**Line Power Manufacturing Corporation** - Engineered electrical distribution and control apparatus including low and medium voltage metal-enclosed switchgear, power control centers, motor controls, and substations. Electrical power distribution systems and components used in mining. ISO 9001:2015 Registered.

**MAFESA** - Electro-Mechanical Corporation’s manufacturing facility in Mexico for stock low-voltage transformers.

**Engineered Solutions** - The Engineered Solutions Group specializes in the innovative design and creation of engineered medium voltage switchgear for Data Center, Solar Energy and other alternative energy, mission-critical projects worldwide.

**Machinery Components Division** - Manufactures prototype and machined component products.


**Line Power Parts & Rebuild** - Complete electrical equipment remanufacturing and onsite electrical equipment service. The parts service department provides replacement components manufactured by Electrical Group companies as well as commonly used OEM parts.
Dual Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-2

- Dual Circuit Vacuum Circuit Breaker Switch-House, VCB-2 Featuring:
- Designed to Comply With MSHA Regulations
- Designed for 12470/7200 VAC Input
- Designed With Strip Heaters and Circuit Breaker Protection
- Designed With Optional Features:
  - Dust and Water-Tight Enclosure Designed for Underground, Heavy-Duty Applications
  - Line Power High Voltage Input and Feed Through and Output Flange Terminators
  - Line Power Lid “Whisker” Switches
  - Line Power 15 kV, 600 Amp Vacuum Circuit Breaker With Manual Operation, 125 VDC Shunt Trip, Capacitor Trip Device and Grounded-In-Open-Position With Grounding Bar
  - Over-Current and Ground Fault Relay
  - Line Power High Voltage Ground Monitor
  - Line Power Capacitor Trip Device
  - Utility Circuit With 5 kVA, 12470/7200 VAC Control Power Transformer; One 20 Amp and Three 15 Amp Circuits With Circuit Breaker Protection
- Designed With Accessory Features:
  - Schedule 80, 3” Pipe Bumper on Each End of Switch-House
  - High Shock Voltmeter and Switch
**Dual Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-2**

- Dual Circuit Vacuum Circuit Breaker Switch-House, VCB-2 Featuring:
- Designed to Comply With MSHA Regulations and Pennsylvania Bureau of Deep Mine Regulations
- Designed for 12470 VAC Input
- Designed With Strip Heaters and Circuit Breaker Protection
- Designed With Optional Features:
  - Dust and Water-Tight Enclosure Designed for Underground, Heavy-Duty Applications
  - Line Power High Voltage Gear-Mount, 1/4 Turn No-Thread Input, Feed Through and Output Couplers With One Ground Check, Dust Cover and Teflon Insulators
  - “GO” Magnetic Proximity Lid Switches
  - Over-Current and Ground Fault Relay
  - Line Power High Voltage Ground Monitor
  - Line Power Capacitor Trip Device
  - Utility Circuit With 5 kVA, 12470 VAC Control Power Transformer; One 30 Amp and Four 20 Amp Circuits With Circuit Breaker Protection
- Designed With Accessory Features:
  - Line Power 15 kV, 600 Amp Vacuum Load Break Switch
  - High Shock Voltmeter and Switch
  - Ammeter and Ammeter Switch For Each Output Circuit
  - Pennsylvania Approval Package
  - High Voltage Coupler Wrench and Mounting Bracket
  - Schedule 80, 3” Pipe Bumper On Each End Of Switch-House
Dual Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-2
Three Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-3

- Three Circuit Vacuum Circuit Breaker Switch-House, VCB-3 Featuring:
  - Designed to Comply With MSHA Regulations
  - Designed For 12470 VAC Input
  - Designed With Strip Heaters and Circuit Breaker Protection
  - Designed With Optional Features:
    - Dust and Water-Tight Enclosure Designed For Underground, Heavy-Duty Applications
    - Line Power High Voltage Gear-Mount, Zip Thread (Coarse) Thread Input, Feed Through and Output Couplers With One Ground Check, Dust Cover and Teflon Insulators
    - “GO” Magnetic Proximity Lid Switches
    - Line Power Draw-Out Design 15 kV, 600 Amp Vacuum Circuit Breaker With Motor Operator, and Shunt Trip Operated By Capacitor Trip Device
    - Over-Current and Ground Fault Relay
    - Line Power High Voltage Ground Monitor
    - Line Power Capacitor Trip Device
    - Utility Circuit With 5 kVA, 12470 VAC Control Power Transformer; One 15 Amp Circuit With Circuit Breaker Protection
  - Designed With Accessory Features:
    - Voltmeter 0-150 Volts; 3.5” Window
    - Center Positioned Towing Plate With a Chain-Attached 1.5” Pin At Each End of Switch-House
    - Schedule 80, 3” Pipe Bumper On Each End of Switch-House
Three Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-3
Four Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-4

- Four Circuit Vacuum Circuit Breaker Switch-House, VCB-4 Featuring:
- Designed To Comply With MSHA Regulations
- Designed For 13800 VAC Input
- Designed With Strip Heaters and Circuit Breaker Protection
- Designed With Optional Features:
  - Dust and Water-Tight Enclosure Designed For Underground, Heavy-Duty Applications
  - Line Power High Voltage Gear-Mount, 8 Pitch, Fine Thread Input, Feed-Through and Output Couplers With One Ground Check, Dust Cover and Hard Rubber Insulators
  - Line Power “Whisker” Switch Lid Switches
  - Line Power 15 kV, 600 Amp Vacuum Circuit Breaker With Manual Operation, and Shunt Trip Operated By Capacitor Trip Device and Grounded-In-Open-Position With Grounding Bar
  - Two Right Hand and Two Left Hand Operated Vacuum Circuit Breakers
  - Over-Current and Ground Fault Relay
  - Line Power High Voltage Ground Monitor
  - Line Power Capacitor Trip Device
  - Utility Circuit With 5 kVA, 13800 VAC Control Power Transformer; Three 20 Amp and Two 30 Amp Circuits With Circuit Breaker Protection
- Designed With Accessory Features:
  - Voltmeter 0-150 Volts; 3.5” Window
  - High Voltage Coupler Wrench and Mounting Bracket
  - 8-Watt Fluorescent Lights Located At Each Meter Panel
Four Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-4
Dual Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-2

- Dual Circuit Vacuum Circuit Breaker Switch-House, VCB-2TM Featuring:
- Designed To Comply With MSHA Regulations
- Designed To Be Mounted On a Portable Trailer Especially Designed For Surface Mining
- Designed For 6600 VAC, 50 Hz Input
- Enclosure Designed To Comply With NEMA 3R and Have Gaskets Installed In Covers and Doors
- Doors Equipped With Wind Braces
- Designed With Strip Heaters and Circuit Breaker Protection
- Designed With Optional Features:
  - High Voltage Input and Output Couplers
  - Doors and Covers Equipped With Line Power “Whisker” Switch Switches
  - Over-Current and Ground Fault Relay
  - Line Power High Voltage Ground Monitor
  - Line Power Capacitor Trip Device
  - Utility Circuit With 5 kVA, 6600 VAC Control Power Transformer
- Designed With Accessory Features:
  - High Shock Voltmeter and Switch
  - Ammeter and Ammeter Switch For Each Output Circuit
Dual Circuit, Open-Type Vacuum Circuit Breaker Switch-House, VCB-2
**Line Power High Voltage Couplers**

**LINE POWER ... the outstanding difference is the insulating system**

- A solid, heavy, rigid insulator to prevent contact misalignment when cable is moved.
- A firm insulator tube of high track resistance EPDM rubber to prevent folding during coupling.
- Two positive O-Ring Seals between insulator and housing, one to prevent compound leakage, the other to prevent outside moisture from entering.
- LINE POWER high voltage couplers mate with other high voltage couplers.

**Series 19 15kV Gear Mount Receptacle / Series 96 15kV Line Coupler**

**The Line Power Insulating System**

**Teflon Insulating System Also Available**

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Flange Terminators

General

The Line Power Flange Terminator is a rugged combination of a strain relief mechanism and a water tight seal which is designed for use on all types of electrical equipment. It will accept a wide range of high and low voltage cable sizes. The Line Power Flange Terminator is superior to so called "cord grips" in that it provides mechanical strain relief through cable gripping aluminum clamps and a water tight seal through a rubber grommet. Conventional "cord grips" providing mechanical gripping with their grommet and do not use cable gripping clamps.

Selection

<table>
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<tr>
<th>Flange Terminator Part Number</th>
<th>Cable Range</th>
<th>Item 3 Cable Seal Part Number</th>
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<td>02-2566-16</td>
<td>7/8x2 - 1x2-1/4</td>
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Line Power Flange Terminators are available in four types of mountings. The 02-2567 Series uses six (6) mounting holes on a 7 - 7/8" diameter circle, the same mountings as all PMG and SFG High Voltage Couplers (except SFG08). The 02-2568 Series mounts like the SFG08 High Voltage Coupler, six (6) holes on an 8 - 5/8" diameter circle. 02-2503 thru 02-2524 Flange Terminators use six (6) holes on a 6 - 1/8" diameter circle. The 02-2566 Series uses four (4) mounting holes in a 4 - 1/4" square pattern as found PG39, 59, 60, 67, 68, 69, 79 and 85 Low Voltage Couplers.
**Application**

Line Power Manufacturing’s Vacuum Circuit Breaker, 3-phase, 15.5 kV power interrupting device, is designed to provide protection for all types of electric feed circuits within its ratings.

**Ratings (600 Amp Model)**

- Continuous Current ...................... 600 Amperes*
- Maximum Voltage ...................... 15.5 kV
- Symmetrical Interrupting Capacity ........... 12,500 Amperes per IEEE Std. C37.60
- Lightning Impulse Withstand (BIL) ........ 95 kV
- Switching Current ...................... 630 Amps, per IEEE Std. C37.60

**Features**

- Mechanically interlocked visible disconnect.
- Independent bottle wear indicators.
- Each bottle assembly can be independently adjusted for proper contact pressure to insure that adequate interrupting capacities are met.
- Optional Accessories
  - Load side grounding of visible disconnect
  - Non-isolated
  - Isolated
  - Shunt Trip
  - Undervoltage release
  - Motor operation
  - Key interlocks

* Consult factory for 630 amp applications.
15.5 kV 1200 Amp Vacuum Circuit Breaker

Application
Line Power Manufacturing’s Vacuum Circuit Breaker, 3-phase, 15.5 kV power interrupting device, is designed to provide protection for all types of electric feed circuits within its ratings.

Ratings (1200 Amp Model)
Continuous Current ...................... 1200 Amperes
Maximum Voltage .......................... 15.5 kV
Symmetrical Interrupting Capacity .... 18,000 Amperes
Lightning Impulse Withstand (BIL) ...... 95 kV
Switching Current .......................... 1200A

Features
• Mechanically interlocked visible disconnect.
• Independent bottle wear indicators.
• Each bottle assembly can be independently adjusted for proper contact pressure to insure that adequate interrupting capacities are met.
• Optional Accessories
  - Load side grounding of visible disconnect
    - Non-isolated
    - Isolated
  - Shunt Trip
  - Undervoltage release
  - Motor operation
  - Key interlocks
Application
Line Power Manufacturing’s Vacuum Circuit Breaker, 3-phase, 27kV power interrupting device, is designed to provide protection for all types of electric feed circuits within its ratings.

Specifications

Continuous Current ......................... 600 Amperes*
Maximum Voltage ............................. 27 kV
Symmetrical Interrupting Current ........... 12,500 Amperes
Lightning Impulse Withstand (BIL) .......... 125 kV
Switching Current ............................. 600 Amperes

Features

- Mechanically interlocked visible disconnect.
- Independent bottle wear indicators.
- Each bottle assembly can be independently adjusted for proper contact pressure to insure that adequate interrupting capacities are met.
- Optional Accessories
  - Load side grounding of visible disconnect
  - Non-isolated
  - Isolated
  - Shunt Trip
  - Undervoltage release
  - Motor operation
  - Key interlocks

* The VCB is rated 600 amps continuously in a 40° C environment with one square foot of total ventilation or a 35° C environment with no ventilation.
Derating to 580 amps is required if the VCB is operated at 40° C environment without ventilation.
**Application**

Line Power Manufacturing’s Vacuum Loadbreak Switch is designed for rugged-duty, mining applications. The low profile, compact design makes this switch well suited for mine applications.

**Ratings**

- Continuous Current: 600 Amperes
- Maximum Voltage: 15 kV
- Symmetrical Interrupting Current: 2000 Amperes
- Lightning Impulse Withstand (BIL): 60 kV
- Switch Current: 600 Amperes

**Features**

- Each bottle assembly can be independently adjusted for proper contact pressure to insure that adequate interrupting capacities are met.
- Visible disconnect switch grounds the output terminals when in the fully-opened position.
- Switch can be tripped manually, or through an optional shunt trip and/or undervoltage release.
- Optional electrical closing and auxiliary switches are available.
High Voltage Ground Monitor

Application

The Line Power Manufacturing High Voltage Ground Monitor is an impedance-type ground monitor that can operate in either of two modes: UVR Mode or Non-UVR mode. Mode selection is made by changing the position of the “C1” lead on the rear of the unit. The unit is normally shipped wired in the UVR Mode. The UVR mode is fail-safe where the Non-UVR mode is not fail-safe.

In the UVR Mode, the monitor relay will energize when control power is present and the pilot-ground loop is complete with normal continuity. If the ground loop is “lost” (impedance increases 3 ohms or more after proper initial adjustment of the unit) the monitor relay will trip (de-energize) and the face plate indicator will indicate “Tripped”. The monitor is shipped wired for manual (“lockout” or “hand reset mode”) and can be wired for automatic reset by the addition of a jumper on the rear terminals. When this jumper is added, the trip indicator continues to function, but the relay will automatically reset when the ground loop is restored.

In the Non-UVR Mode, the relay is normally de-energized. The relay energizes to perform a trip function only when control power is present and the ground loop is open. To utilize the advantages of the monitor in the Non-UVR mode, the associated circuit breaker must employ a potential trip device. As with the UVR mode, the lock-out function can be defeated with a jumper. With this jumper (while in the Non-UVR mode) the relay states are reversed (lock-out puts the relay into an energized state instead of de-energized.)
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Genuine Line Power Component Parts

Switches

Vacuum Circuit Breakers

Low and High Voltage Couplers, Flange Terminators

Ground Monitors and Ground Fault Relays

High Voltage Splice Boxes

Mine-Duty Transformers