

Diamondback

Solid Dielectric Load Break Switch Catalog

Distributed By:



The G&W logo consists of the letters "G&W" in a bold, blue, sans-serif font.



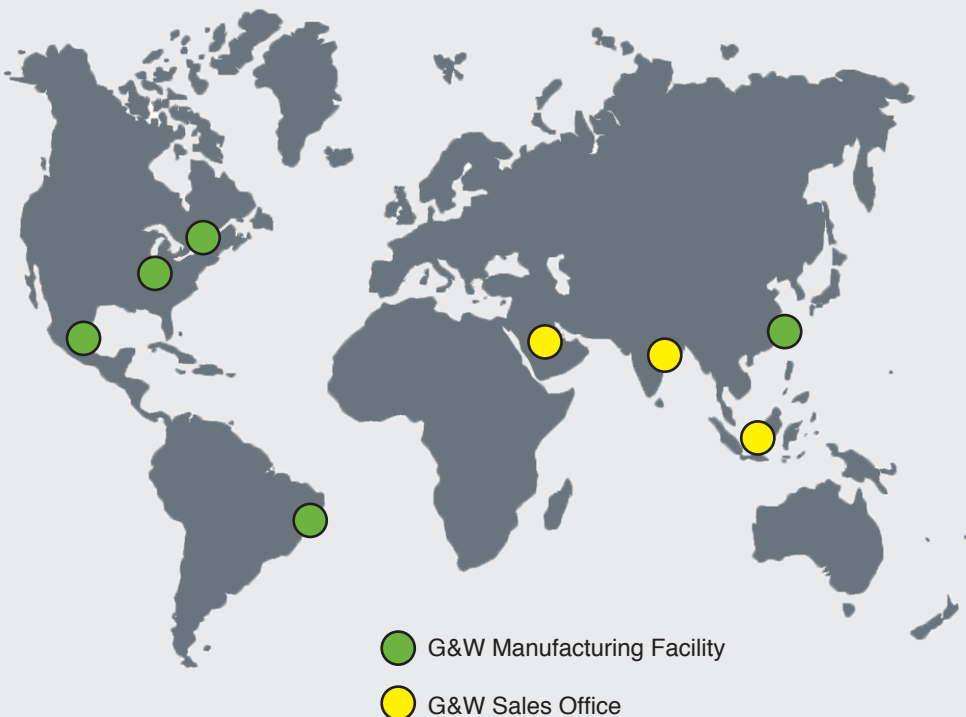
▲ G&W headquarters in Bolingbrook, IL USA

COMPANY PROFILE

Since 1905, G&W Electric has helped energize the world with innovative power system solutions. With the introduction of the first disconnecting cable terminating device, G&W began to build a reputation for engineering custom solutions to meet the needs of system designers. Solutions which today have extended far beyond cable accessory products and into the latest in load and fault interrupting switchgear, reclosers, system protection equipment and distribution automation.

HEADQUARTERS

G&W headquarters is located in Bolingbrook, IL, USA, a suburb of Chicago. G&W also has manufacturing facilities or sales offices in China, Mexico, Canada, Dubai, India, Singapore and Brazil. G&W covers the globe with product installations and sales representation in over 100 countries and all seven continents.



G&W Electric Facilities:

G&W Electric Co. Headquarters
(Bolingbrook, IL, USA)

G&W China (Shanghai)

G&W Canada
(Mississauga, Ontario)

G&W Mexico (San Luis Potosí)

G&W do Brasil (Salvador)

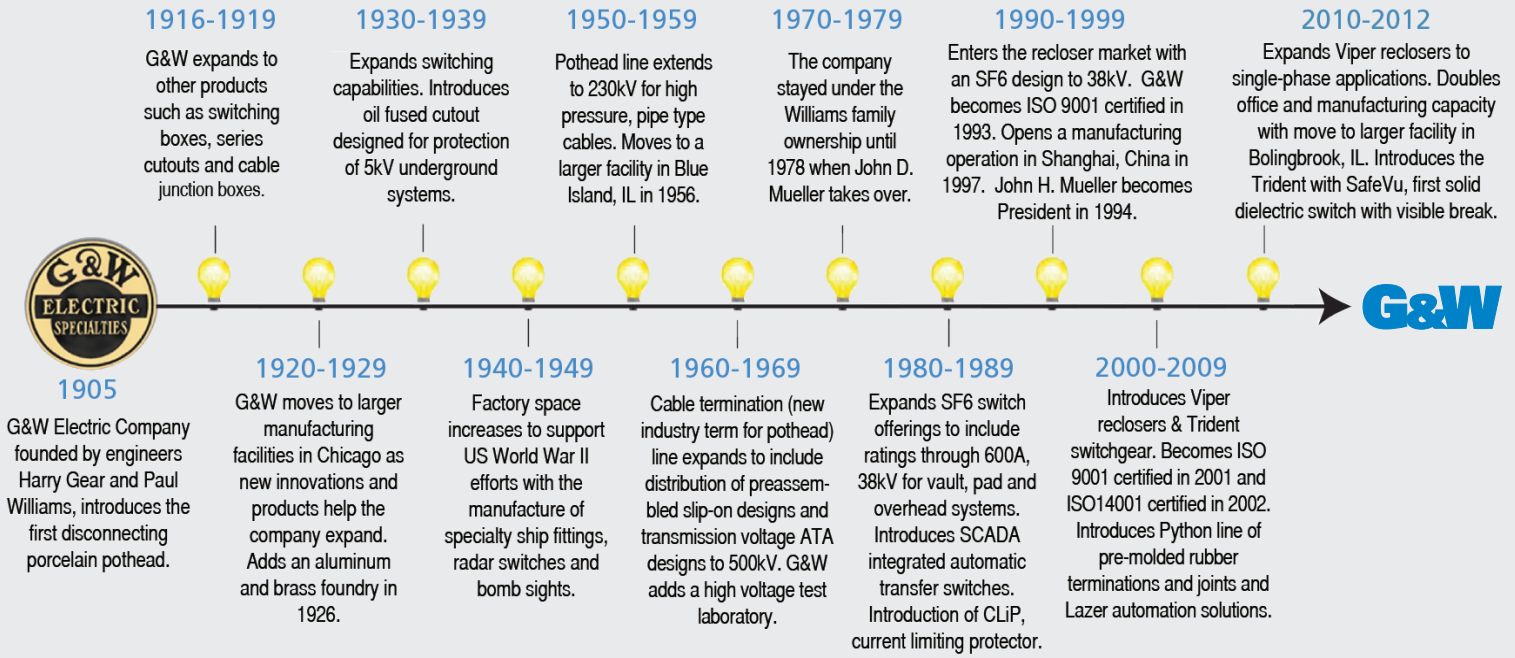
G&W sales office (Dubai)

G&W sales office (Delhi, India)

G&W sales office (Singapore)

Manufacturer's Brass and Aluminum Foundry
(Blue Island, IL, USA)

OVER 110 YEARS SERVING OUR MARKETS



G&W PRODUCT OVERVIEW



Single and Three Phase Solid Dielectric Reclosers



Solid Dielectric Underground Distribution Switchgear



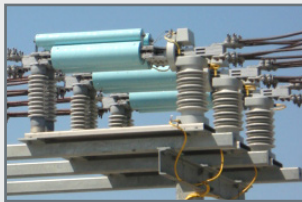
SF6 Underground Distribution Switchgear



System Automation and Smart Grid Solutions



Three Phase Overhead Load Break Switches



System Protection Equipment

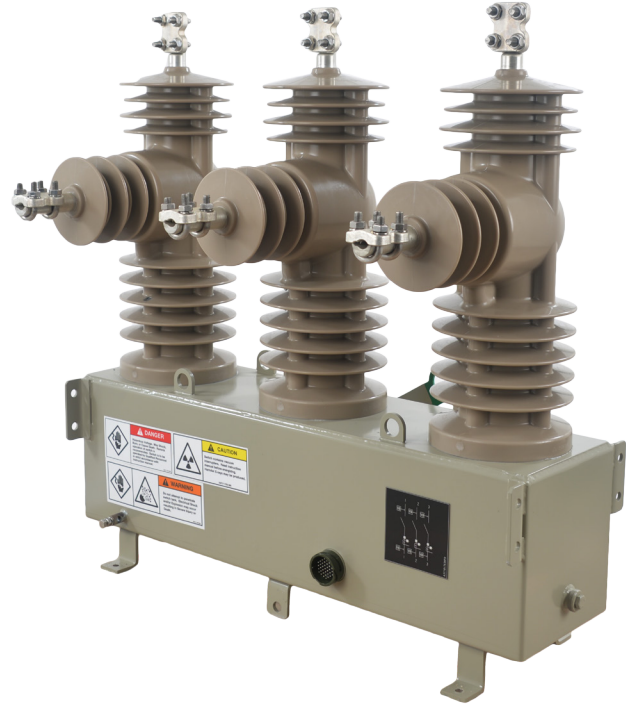


Transmission and Distribution Cable Accessories

The **Diamondback** switch is a solid dielectric, three-phase load break switch for overhead applications. The Diamondback switch combines the time-proven reliability of vacuum bottles with the maintenance-free benefits of a solid dielectric insulated device. Diamondback is designed for three phase automatic or manual switching operations providing circuit isolation for systems rated up to 25.8 kV, 630 A continuous current. The compact, light-weight design provides ease of installation. Diamondback has been designed and tested to comply with the IEC 62271-103 standard (formerly IEC 60265-1:1998).

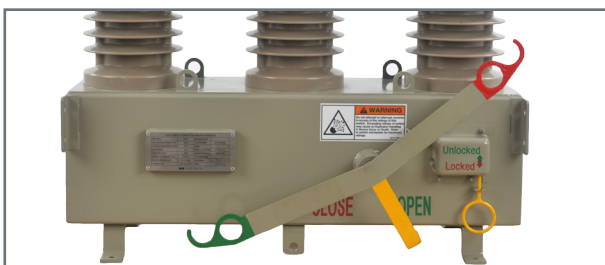
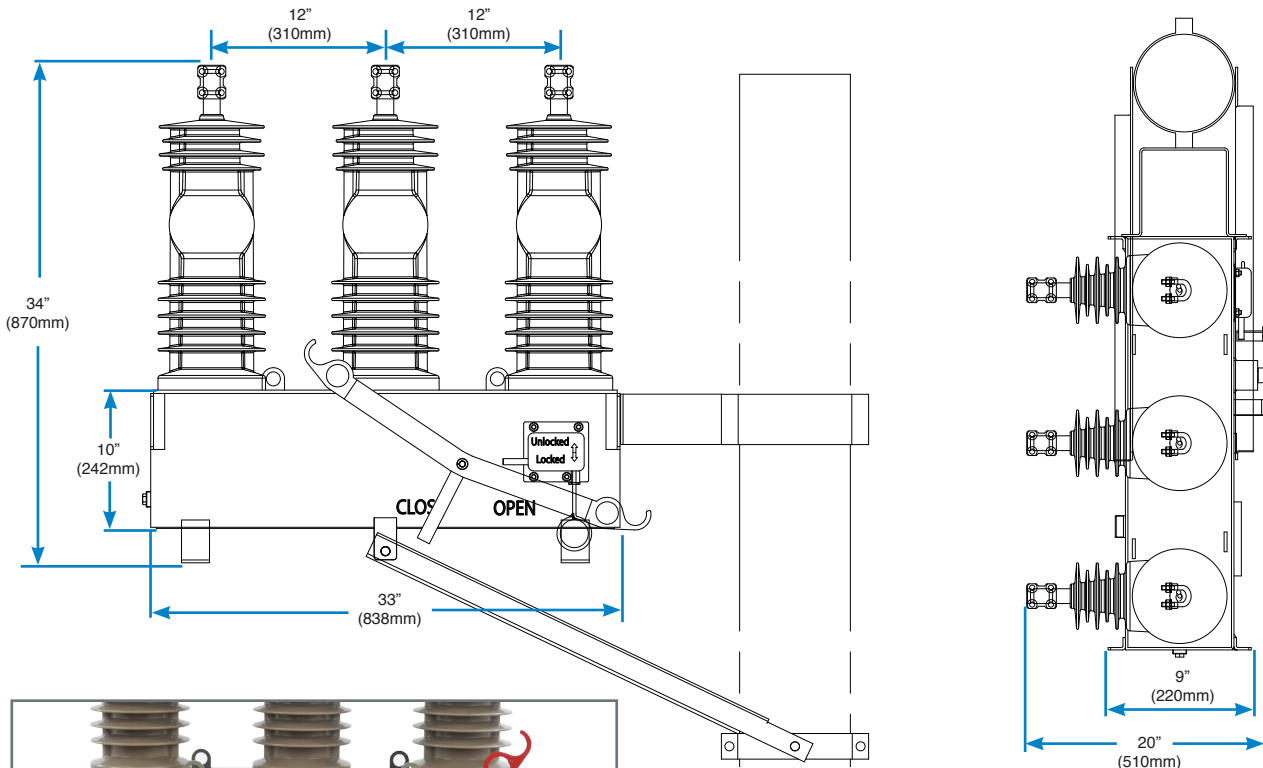
SOLID DIELECTRIC MODULES

The solid dielectric modules utilize a time-proven solid dielectric epoxy insulation to fully encapsulate each of the three vacuum interrupters. The operating temperature range of the switch is -30°C to $+50^{\circ}\text{C}$ (-22°F to $+122^{\circ}\text{F}$). A 1000:1 ratio current transformer with $\pm 1\%$ accuracy is encapsulated into each solid dielectric module. There are six (6) internal voltage sensors that allow for voltage measurement on both the source and load side of the device. These voltage sensors are encapsulated inside the solid dielectric modules and have an accuracy of $\pm 3\%$.



▲ G&W Diamondback load break switch

Standard Polemount (pole mounting brackets are included)



◀ Open/close handle

FEATURES AND BENEFITS

Features	Benefits
Solid dielectric Insulation, uses no oil, SF6 or greenhouse gases	No maintenance or monitoring system necessary, common with oil of SF6 insulation. Solid dielectric provides lowest total lifecycle cost.
	Solid dielectric material is inert, environmentally friendly
Easy to automate with the control and FTU-P200	Smart Grid Ready
Integrated six voltage sensors	Less equipment & weight on pole reduces future maintenance. Less congestion on pole improves reliability. Enables full line metering capability for Smart Grid applications.
Compact size and lightweight construction	Allows for installation in tight areas and eases handling during installation
Reversible alley arm frame	Frame is reversible and provides installation flexibility in switch orientation.

ELECTRICAL RATINGS

Maximum Voltage		25.8kV
Continuous Current		630A
Frequency		50Hz/60Hz
Short Circuit Current, 1 second rms		12.5kA
Making Current Peak		32.5kA / 5 times
Current Switching Capacity Tested per IEC 62271-103	Load Current	630A / 200 times (100%)
		31.5A / 20 times (5%)
	Loop Current	630A / 20 times
	Cable charging Current	25A / 10 times (100%)
		7.5A / 10 times (30%)
	Line charging Current	1.5A / 10 times
	Exiting Current	22A / 10 times
No voltage	5000 times	
Control input voltage		1 Ø 220VAC / 120VAC
Control voltage		24VDC
Power Frequency Withstand Voltage	Dry	60kV / 1min
	Wet	50kV / 10sec
Surge Withstand Voltage		150kV (1.2 times / 50 microseconds)

ORDERING INFORMATION

Standard:

- 1000:1 CT ratio (single ratio), +/- 1% accuracy
- Six (6) Internal Voltage Sensors, +/- 3% accuracy
- Controller with FTU-P200C or FTU-P200 for automatic operation with 220VAC control power (with stainless steel enclosure)
- Stainless Steel tank
- One (1) operating mechanism, three phase operation
- One (1) manual operation handle
- One (1) lockout handle
- One (1) Reversible Alley arm frame

- One (1) Control cable 8m/16.25ft (max length 10m)
- One (1) Power cable 6m/19.7ft (max length 10m)
- Six (6) Clamp type aerial lugs
- One piece packaging for switch and control

Options (check all that apply):

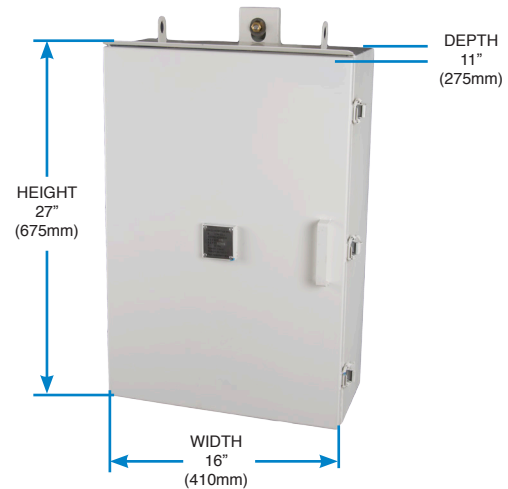
- Manual controller (local operation only)
- Control Power: 120VAC control power
- Wildlife Protectors

CONTROL CONNECTIONS



The 37-pin connector and control cable make the connection between the Diamondback switch and the control, providing operations, status, and current and voltage monitoring capabilities. Two cables are provided: (1) six meter for power, and (1) eight meter control cable.

◀ 37-pin connector for control connection and 3-pin for AC power connection.



▲ Control enclosure dimensions

AUTOMATED CONTROL WITH FTU

Control Measurement

- Magnitude and phase angle of voltages and currents (fundamental frequency)
- Sequence components of 3-phase voltages and currents
- True RMS, Harmonics and THD of voltages and currents
- Active, reactive and apparent power for each phase and 3-phase
- Energy (4 quadrant metering)
- Displacement Power Factor
- Frequency
- PQM, Fault, THD Counter
- Phase difference between source-side and load-side voltage

Control Features

- Fault Detection (Phase and Earth Fault)
- SEF (Sensitive Earth Fault) Detection
- Cold Load protection (pickup adjustment)
- Magnetizing Inrush Restraints
- Open Line Detection
- Phase Synchronous Fail Detection
- Over-voltage, under-voltage
- Under-frequency, over-frequency

Control Communication Protocols

SCADA port

- DNP 3.0
- DNP 3.0 over TCP/IP
- IEC60870-5-101
- IEC60870-5-104 (Unbalanced/Balanced- FTU-P200)

Maintenance Port

- Modbus-FTU

GSM/GPRS

- Supports PPP connection, SMS

SNTP Client

- Supported through TCP/IP port



◀ Automated controller with FTU-P200C

SWITCH APPLICATIONS

Switches play a fundamental role in improving distribution reliability. By applying Diamondback switches in strategic locations on the distribution system, faults can be isolated to minimize the outage area, loads can be distributed according to system conditions, critical loads can be kept on-line, individual protective devices or sections off-line can be bypassed during routine maintenance, and loads can be dropped to prevent overloading the source. In short, switches are typically used to reconfigure a distribution system to minimize outages and increase system reliability.

MANUAL SWITCHING

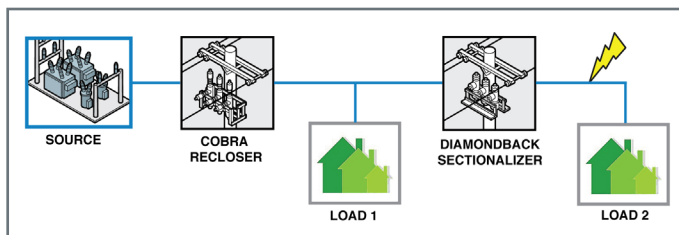
By installing manually operated switches, a user can economically redistribute power during times of planned outages for routine line maintenance, equipment replacement, or even seasonal load adjustments. Manual switches can also be used to isolate faults in areas where immediate power restoration is not necessary, or to perform an emergency sectionalizing function to quickly restore power to the customers affected by a power outage. The Diamondback switch does not require de-energizing the system prior to switching so customer service is not disrupted.

AUTOMATED SWITCHING

By adding a controller to the Diamondback switch, the user can perform all of the functions of a manually operated switch without having to dispatch a crew to the switch site. Additionally, current and voltage can be monitored via SCADA.

Fault Isolation

When combined with a control, the Diamondback switch can be used as an automatic sectionalizing device for automatic fault isolation. Six voltage sensors and three current transformers are provided as a standard feature on the Diamondback switch. Most logic schemes require a fault interrupting device to be upstream from the sectionalizing switches. The protective device must be either locked out or programmed for a specific reclose interval plus a time safety factor to allow



▲ Application example: Diamondback paired with a Cobra-S recloser

Application Example: Diamondback paired with a Cobra Recloser

1. A fault occurs between Diamondback sectionalizer and Load 2
2. The Cobra recloser starts reclosing sequence: trips open, closes, trips open
3. The Diamondback sectionalizer opens after 2nd overcurrent trip
4. The Cobra Recloser closes and restores power on the line between the Cobra Recloser and Diamondback Sectionalizer

Tie Switches

For tie applications, the Diamondback switch control senses a voltage loss on either the source or the load side to determine whether or not to close in from a normally open condition between two different sources. Once the voltage on one source has been lost for a pre-programmed period of time, the tie switch will close in restoring power to the de-energized line. Current transformers "tell" the controller that a fault exists when the main contacts are closed. For a normally open tie, the tie may close into a fault upon loss of voltage on one feeder. The control "knows" of the faulted condition and would not open unless it detects a loss of voltage on the faulted feeder side, signifying the upstream protective device has operated.

On a normally closed tie, the switch control would use similar logic, but no fault closing would be necessary prior to isolating the fault. Tie switches can also be applied to automatically bypass a feeder which has been locked out due to a failure, planned outage or a faulted line. If the switch closes into a fault, the tie switch would open once the upstream protective device has opened, de-energizing the line.

Loop Schemes

Loop schemes generally consist of two or more sources tied into a distribution system to ensure backup power is available when the primary feeder is lost. The scheme utilizes sectionalizing and tie switches to automatically isolate the fault and restore power to all areas unaffected by the fault quickly and reliably using the same principles and methods described previously.

Automatic Transfer

For critical load applications such as hospitals, processing plants, military bases, etc., automatic transfer schemes are common. For overhead systems, this scheme requires two switches, voltage sensors and current transformers and a voltage-time controller. A loss of voltage on the primary source is sensed and initiates the controller to open the primary and close the alternate source switch to automatically restore power.

SCADA / Distribution Automation

Switches can perform the above functions either autonomously or through a SCADA system where the switch controls incorporate FTUs for interfacing with a master station. A variety of SCADA applications are available which employ either a master-slave or peer-to-peer communications architecture.

Lazer Automation

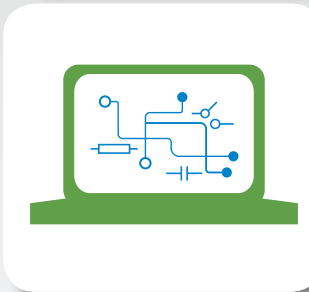
The distribution automation expertise and products of G&W and the high end software knowledge of Survalent Technology, our software company, have been combined to provide a state of the art solution – Lazer Automation. Three levels of Lazer solutions are available; Lazer I for peer-to-peer product applications, Lazer II for stand-alone controller based systems, and Lazer III for total system wide management and control.

G&W offers Technical Support and Services:



Custom Engineering

Our engineers can tailor our products to meet the needs of any application.



Custom Programming

Our automation engineers can provide tailored relay programs to meet any specified needs.



Factory Acceptance Testing

G&W's Factory Acceptance Testing ensures customers' automation solutions are certified to operate properly and meet all requirements prior to being installed in the field.



Training Services

G&W offers a range of training solutions at both G&W facilities and on site.



24 Hour Technical Support

Technical support for G&W products is available 24 hours a day, 7 days a week.

G&W

Engineered to order. Built to last.

Distributed By



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