



## VANTAGE™ STYLE SF<sub>6</sub> SWITCHES



*Three position load and fault interrupting switching through 38kV, 25kA symmetric*



- Fully tested to ANSI/IEEE C37.60 and C37.74
- Tested to IEC 62271-201, Annex A for arc resistance
- Integral ground position
- Large viewing windows for open, close and ground contact verification
- Dual operators for added safety
- Operating handle flexibility
- Low profile, small footprint construction

# Vantage SF<sub>6</sub> Switchgear

G&W's Vantage™ style SF<sub>6</sub> switches are designed for load break switching and fault interrupter protection on systems rated through 38kV, 630A continuous, up to 25kA symmetric. Open/close switching with integral ground position simplifies system grounding procedures. Large viewing windows help verify switch contact position for operating personnel. Designs are available for padmount, vault and subsurface applications.

## Features

**Fully tested** - Vantage switches are fully tested to ANSI/IEEE C37.74 and C37.60 standards. Switches comply to arc resistance requirements of 25kA for 15 cycles per IEC 62271-201, Annex A.

### **Operator ease and safety** -

Switches are dead-front construction. An integral ground position eliminates the need to remove cables for grounding. Large viewing windows (6" x 8" rectangle) assure visible verification of open, closed and ground positions. Dual operators permit ease of operation while prohibiting any accidental operation from the closed position to ground. Operating handles are hookstick or rope operable either permanently mounted or removable.

### **Temperature compensated**

**pressure gauge** - Measures internal gas density for maximum precision of switch operating conditions. The gauge is color coded to simplify reading by operating personnel.

### **Low profile, small footprint**

**construction** - Switches incorporate front access to operating apparatus and back access to cables. An angled front tank design facilitates operation from the front or from above ground for subsurface applications.



▲ Color coded temperature compensated pressure gauge and fill valve.



▲ Dual operators with mechanical interlocks assure positive operation and hookstick handle capability.

Photos (top to bottom) show closed, ► open and ground contacts as seen through the viewing window.



## Application Flexibility

### Padmount applications

For padmount applications, G&W's Vantage switch provides separate compartments for the cables and operating apparatus. The cable side incorporates in-line bushings for elbow connectors. The operating side incorporates hookstick operable handles for easy push/pull operation. A flip-up enclosure facilitates access to viewing windows and provides ample space for operating handle movement. Fault interrupting controls are typically mounted to the swing-out enclosure doors.



▲ Rear view of switch showing in-line bushings.



### Subsurface applications

For confined space, subsurface vault applications, the Vantage switch operating handles permit easy hookstick operation from above ground. The use of hooksticks permit operating personnel to be at a distance from the vault opening when operating the switch. Vantage switches are submersible.

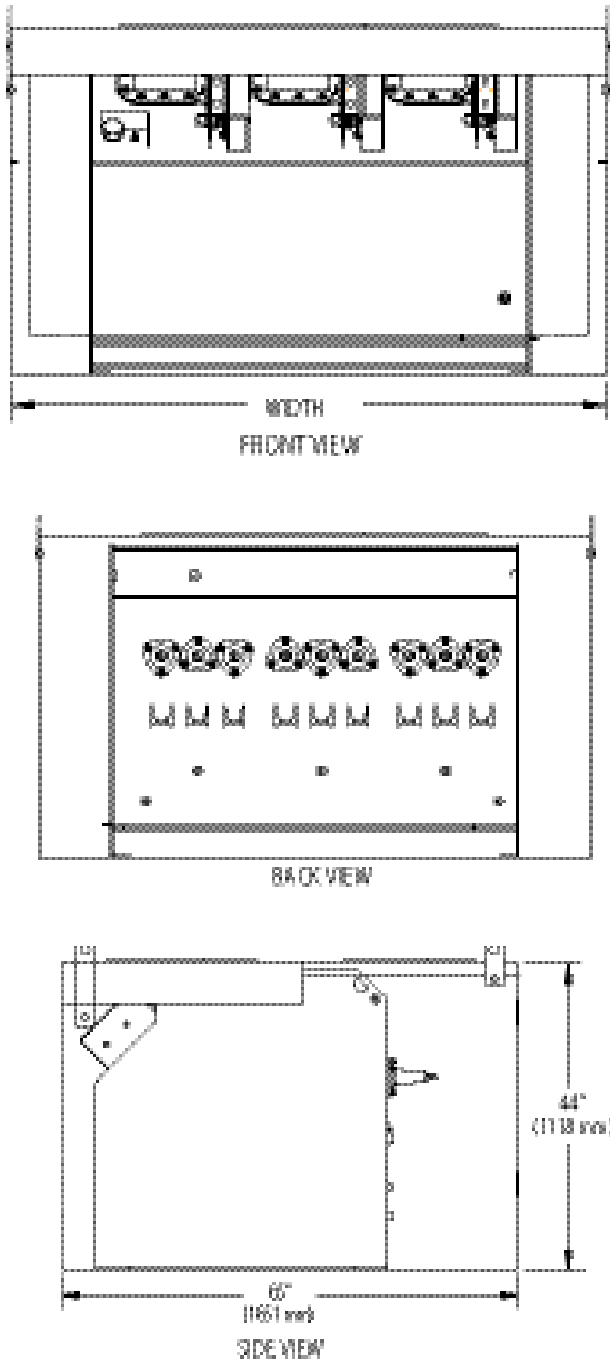
### Underground vault applications

For vaults large enough for operating personnel access, Vantage switch operating handles permit easy hookstick operation from the front of the switch. Fault interrupting controls can be mounted directly on the switch or hardwired with enough cable for mounting to an adjacent vault wall. Controls can be supplied with submersible enclosures if required. Switches can be either floor or wall mounted.



## Padmount Style Vantage Switches

Padmount style switches provide separate compartments for access to cable connections and switch operators. A flip up enclosure facilitates access to viewing windows and hookstick operation. Fault interrupter controls can be mounted directly to the switch or in a separate cabinet on the side of the enclosure.



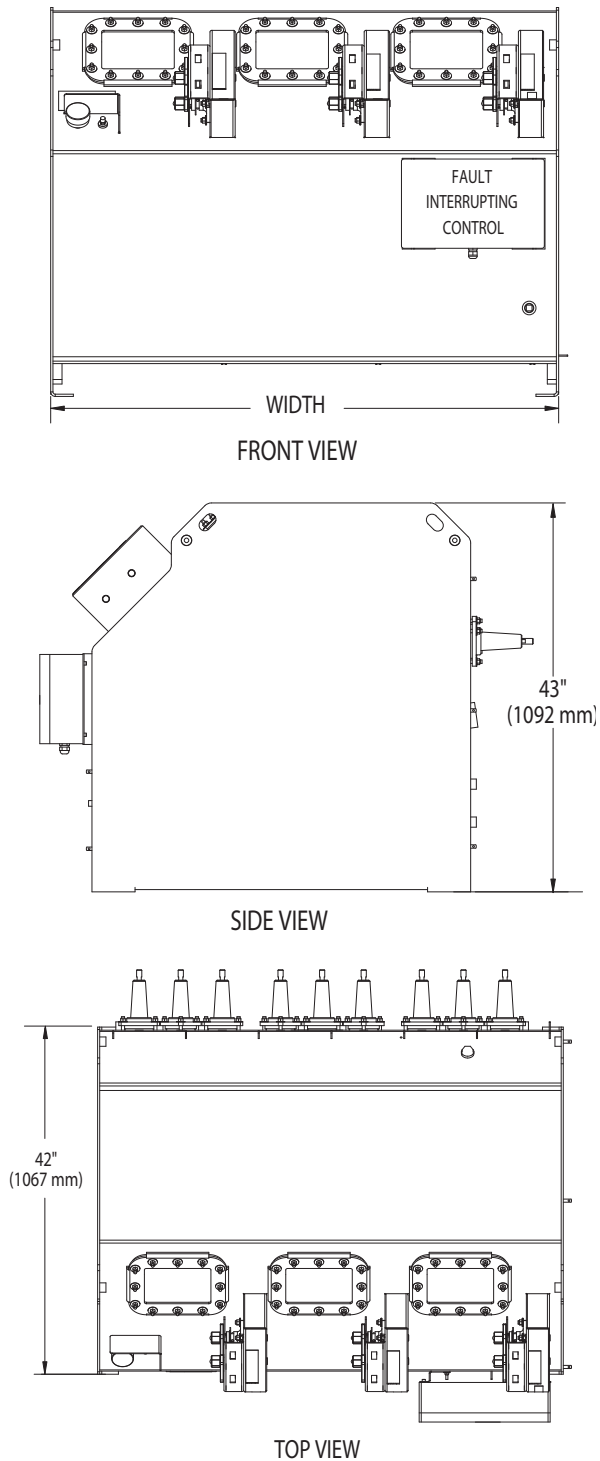
Model	One-line Diagram	Voltage Class (kV)	Catalog Number**	Approximate	
				Width in. (mm)*	Wt. w/ SF6 lbs (kgs)
5		15	DSTI21-376-25-5L	50 (1270)	2100 (955)
		25	DSTI21-386-25-5L		
		35	DSTI21-396-25-5L		
6		15	DSTI32-376-25-6L	76 (1930)	3250 (1477)
		25	DSTI32-386-25-6L		
		35	DSTI32-396-25-6L		
7		15	DSTI31-376-25-7L	76 (1930)	3250 (1477)
		25	DSTI31-386-25-7L		
		35	DSTI31-396-25-7L		
9		15	DSTI42-376-25-9L	79 (2007)	4000 (1818)
		25	DSTI42-386-25-9L		
		35	DSTI42-396-25-9L		
11		15	DSTI43-376-25-11L	79 (2007)	4000 (1818)
		25	DSTI43-386-25-11L		
		35	DSTI43-396-25-11L		
12		15	DSTI41-376-25-12L	79 (2007)	4000 (1818)
		25	DSTI41-386-25-12L		
		35	DSTI41-396-25-12L		
51		15	DSTI51-376-25-51L	110 (2794)	4850 (2204)
		25	DSTI51-386-25-51L		
		35	DSTI51-396-25-51L		
52		15	DSTI52-376-25-52L	110 (2794)	4850 (2204)
		25	DSTI52-386-25-52L		
		35	DSTI52-396-25-52L		
53		15	DSTI53-376-25-53L	110 (2794)	4850 (2204)
		25	DSTI53-386-25-53L		
		35	DSTI53-396-25-53L		
54		15	DSTI54-376-25-54L	110 (2794)	4850 (2204)
		25	DSTI54-386-25-54L		
		35	DSTI54-396-25-54L		
62		15	DSTI62-376-25-62L	113 (2870)	5600 (2545)
		25	DSTI62-386-25-62L		
		35	DSTI62-396-25-62L		
63		15	DSTI63-376-25-63L	113 (2870)	5600 (2545)
		25	DSTI63-386-25-63L		
		35	DSTI63-396-25-63L		
64		15	DSTI64-376-25-64L	113 (2870)	5600 (2545)
		25	DSTI64-386-25-64L		
		35	DSTI64-396-25-64L		
65		15	DSTI65-376-25-65L	113 (2870)	5600 (2545)
		25	DSTI65-386-25-65L		
		35	DSTI65-396-25-65L		

\* Approximate dimensions, height = 44" (1118mm);  
depth = 65" (1651mm).

\*\* For 12.5kA fault interrupting design, replace catalog digits -25 with -12. Switch dimensions are the same.

## Vault Style Vantage Switches

Vault style switches provide submersible construction for subsurface or underground vault applications. Fault interrupter controls can be mounted directly to the switch or on the vault wall. Switches can be mounted on the vault floor or wall.



Model	One-line Diagram	Voltage Class (kV)	Catalog Number**	Approximate	
				Width in. (mm)*	Wt. w/ SF6 lbs (kgs)
5		15	VDSTI21-376-25-5L	39 (991)	1500 (682)
		25	VDSTI21-386-25-5L		
		35	VDSTI21-396-25-5L		
6		15	VDSTI32-376-25-6L	56 (1422)	2250 (1023)
		25	VDSTI32-386-25-6L		
		35	VDSTI32-396-25-6L		
7		15	VDSTI31-376-25-7L	56 (1422)	2250 (1023)
		25	VDSTI31-386-25-7L		
		35	VDSTI31-396-25-7L		
9		15	VDSTI42-376-25-9L	73 (1854)	3000 (1364)
		25	VDSTI42-386-25-9L		
		35	VDSTI42-396-25-9L		
11		15	VDSTI43-376-25-11L	73 (1854)	3000 (1364)
		25	VDSTI43-386-25-11L		
		35	VDSTI43-396-25-11L		
12		15	VDSTI41-376-25-12L	73 (1854)	3000 (1364)
		25	VDSTI41-386-25-12L		
		35	VDSTI41-396-25-12L		
51		15	VDSTI51-376-25-51L	90 (2286)	3750 (1705)
		25	VDSTI51-386-25-51L		
		35	VDSTI51-396-25-51L		
52		15	VDSTI52-376-25-52L	90 (2286)	3750 (1705)
		25	VDSTI52-386-25-52L		
		35	VDSTI52-396-25-52L		
53		15	VDSTI53-376-25-53L	90 (2286)	3750 (1705)
		25	VDSTI53-386-25-53L		
		35	VDSTI53-396-25-53L		
54		15	VDSTI54-376-25-54L	90 (2286)	3750 (1705)
		25	VDSTI54-386-25-54L		
		35	VDSTI54-396-25-54L		
62		15	VDSTI62-376-25-62L	107 (2718)	4500 (2045)
		25	VDSTI62-386-25-62L		
		35	VDSTI62-396-25-62L		
63		15	VDSTI63-376-25-63L	107 (2718)	4500 (2045)
		25	VDSTI63-386-25-63L		
		35	VDSTI63-396-25-63L		
64		15	VDSTI64-376-25-64L	107 (2718)	4500 (2045)
		25	VDSTI64-386-25-64L		
		35	VDSTI64-396-25-64L		
65		15	VDSTI65-376-25-65L	107 (2718)	4500 (2045)
		25	VDSTI65-386-25-65L		
		35	VDSTI65-396-25-65L		

\* Approximate dimensions, height = 43" (1092mm);  
depth = 42" (1067mm).

\*\* For 12.5kA fault interrupting design, replace catalog digits -25 with -12. Switch dimensions are the same.

## Typical Specifications

### Vantage Style SF6 Switchgear

This specification covers manually operated, three position, SF6 insulated, disconnect switches with vacuum load break switches and/or electronically tripped vacuum fault interrupters. The switch manufacturer shall be ISO 9001:2000 and 14001:2004 certified.

#### A. SWITCH CONFIGURATION

Each switch shall have:

- \_\_\_ (Qty.) 3-phase load break switched ways
- \_\_\_ (Qty.) 3-phase vacuum fault interrupter tap ways

The switch application shall be:

- \_\_\_ Submersible subsurface vault
- \_\_\_ Submersible vault
- \_\_\_ Front / back access padmount

#### B. SWITCH CONSTRUCTION

All switch components and entrances shall be assembled in a hermetically sealed welded mild steel tank. Switches shall be shipped factory filled with SF6 gas conforming to ASTM D-2472. Entrances shall be internally connected by copper conductors capable of handling momentary and continuous current duty. Construction shall be a dead-front design. Switch tanks shall be painted ASA70 light gray using a corrosion-resistant epoxy paint.

#### Load Break Switches:

The load break interrupter shall consist of three vacuum bottles mechanically linked to a single spring-assisted mechanism providing three phase operation. Current interruption shall be contained within the vacuum bottles. The vacuum interrupter operating mechanism shall consist of the support assembly, linkage and spring latch mechanism. A flag indicator shall indicate the contact position, open or closed. This contact position indicator shall be fully visible through viewing windows supplied in the switch tank. All switch positions

are to be clearly identified and padlockable. The operating mechanism shall be actuated from outside the switch tank by an operating handle.

Visible break confirmation of the switch contacts shall be through a blade style contact system in series with the vacuum interrupter mechanism, activated from outside the switch tank by an operating handle. The external operating shaft of the visible break contacts shall be positioned adjacent to the operating shaft of the load break interrupter to permit a mechanical interlock to prevent any accidental operation from the closed position to ground. Switch contacts shall be clearly visible in the open, closed and ground positions through viewing windows.

#### Fault Interrupters:

The fault interrupter shall consist of three vacuum bottles mechanically linked to a single spring-assisted mechanism providing three phase operation. The vacuum interrupter operating mechanism shall consist of the support assembly, linkage, spring latch mechanism, and solenoid utilized for electronic tripping. Maximum interrupting time shall be three cycles (50 msec). A flag indicator shall indicate the contact position, open or closed. This contact position indicator shall be fully visible through viewing windows supplied in the switch tank.

Each tap phase shall be equipped with an individual three phase vacuum interrupter fully enclosed in an SF6 gas insulated tank. Electrical opening shall be by a solenoid that is activated from sources external to the tank. Closing (reset) of the vacuum interrupter shall be mechanical with the use of an external operating handle. The mechanical linkage assembly shall provide for a "trip-free" operation which allows the vacuum interrupter to interrupt independent of the operating lever.

All interrupter positions shall be clearly identified and padlockable. The operating mechanism shall be

actuated from outside the switch tank by an operating handle.

Visible break confirmation of the switch contacts shall be through a blade style contact system in series with the vacuum interrupter mechanism, activated from outside the switch tank by an operating handle. The external operating shaft of the visible break contacts shall be positioned adjacent to the operating shaft of the fault interrupter to permit a mechanical interlock to prevent any accidental operation from the closed position to ground. Interrupter contacts shall be clearly visible in the open, closed and ground positions through viewing windows.

#### C. FAULT INTERRUPTER CONTROL

An electronic assembly shall be provided to sense load and fault current on each phase of the load tap circuits. Each phase shall have a single current transformer mounted inside the switch tank to provide control power and current sensing. No external power source shall be required for overcurrent protection. The control shall monitor the current on the individual phases of the load circuits using input from the internal current transformers. Temperature range shall be -30°C to +50°C.

Minimum trip selection and trip time current characteristics (TCC) shall be field selectable either programming through the display or by a laptop computer. Maximum time for power up and ready-to-trip when closing on a circuit shall be ten percent of the trip time or 1/2 cycle, whichever is greater. Trip selection may be made with the load taps energized.

#### D. ARC RESISTANCE

The switch shall comply with arc resistance requirements of 12.5kA, 15 cycles per IEC 62271-201, Annex A, without the use of pressure relief devices (rupture disks). The 25kA design shall comply with requirements of 25kA for 15 cycles per IEC 62271-201, Annex A.

# Typical Specifications continued

## E. DESIGN RATINGS AND STANDARDS

### Load break Switches:

Switches shall be designed, tested and built per ANSI/IEEE C37.74 and IEC 265 standards. Certified test reports shall be provided. The switch shall be rated: (select column)

Maximum design voltage,		
kV .....15.5.....27.....38		
Impulse level (BIL),		
kV .....110 .....125.....150		
Continuous and load break current,		
A.....630		
One minute withstand (dry),		
AC kV.....35 .....60.....70		
One minute withstand (dry),		
Production test rating		
AC kV.....34 .....40.....50		
15 minute withstand,		
DC kV ....53 .....78.....103		
Momentary current,		
kA asym .....40		
Fault-close current,		
kA asym (3 times) .....40		
One second current,		
kA sym .....25		
Mechanical endurance,		
operations .....2000		

### Fault Interrupters:

The vacuum interrupter shall be a non-reclosing, manual reset device incorporating vacuum bottles. It shall be designed, tested and built per application sections of ANSI/IEEE C37.60 and C37.74. The vacuum interrupter assembly shall be rated: (select column)

Maximum design voltage,		
kV .....15.5.....27.....38		
Impulse level (BIL),		
kV .....110 .....125.....150		
Continuous and load break current,		
A.....630		
One minute withstand (dry),		
AC kV.....50 .....60.....70		
One minute withstand (dry),		
Production test rating		
AC kV.....34 .....40.....50		

Symmetrical interrupting rating,	
kA* .....25	
Asym. interrupting rating,	
kA asym .....40	
* 12.5 kA design available	

## F. ANSI/IEEE C37.60 FAULT INTERRUPTING DUTY

Percent of Maximum Interrupting Rating	Approx. Interrupting Current, Amps	No. of Fault Interruptions
15-20%	5,000	44
45-55%	12,500	56
90-100%	25,000	16

Total number of fault interruptions: 116

## G. CABLE ENTRANCES

### Load Break Switches:

Cable entrances shall be tested to ANSI/IEEE 386 and be one or more of the following: (check)

- \_\_\_ 600 amp Quik-Change disconnectable apparatus bushing
- \_\_\_ 200 amp Deepwell bushing

### Fault Interrupters:

Cable entrances shall be tested to ANSI/IEEE 386 and be one or more of the following: (check)

- \_\_\_ 600 amp Quik-Change disconnectable apparatus bushing, or
- \_\_\_ 200 amp Deepwell bushing

## H. ENCLOSURE (if applicable)

Enclosures shall be made of 12 gauge galvanized steel and manufactured to ANSI/IEEE C37.72 and C57.12.28 standards. The enclosure shall be mounted independent of the switch allowing removal for ease of cable installation or future replacement if required. Enclosures shall be tamper-resistant incorporating hinged access doors with pentahead locking bolts and provisions for padlocking. The enclosure shall be provided with lifting provisions and painted with a Munsell 7.0GY3.29/1.5 green finish.

## I. FACTORY PRODUCTION TESTS

The bulk SF6 gas supply and each individual switch shall be tested for moisture content. Each individual switch shall undergo a mechanical operation check and a leak test. The

switch shall be factory filled with SF6 and AC hi-pot tested one minute phase-to-phase, phase-to-ground and across the open contacts. Circuit resistance shall be checked on all ways.

Switch tank shall be designed to withstand 15 psig internal pressure and an external pressure of 14 psig without affecting the performance of the switch.

## J. STANDARD COMPONENTS

The following shall be included as standard:

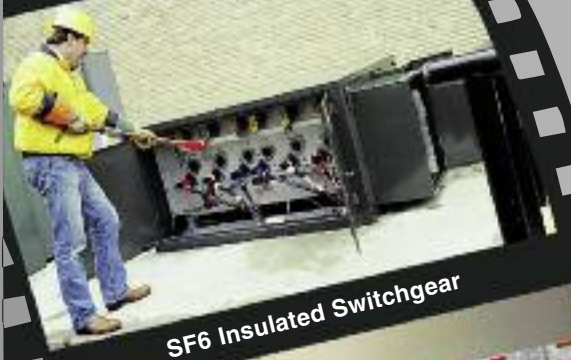
- 1) Welded mild steel tank painted light gray with stainless steel and brass fasteners
- 2) Large 6"x8" viewing windows
- 3) Hookstick operable handle(s) with padlock provision and end stops
- 4) Temperature compensated gas pressure gauge and fill valve
- 5) Grounding provisions for switch tank and all cable entrances
- 6) Stainless steel three line diagram and corrosion-resistant nameplates
- 7) Parking stands
- 8) Lifting provisions
- 9) For padmount switches, a 12 gauge galvanized steel padmount enclosure painted Munsell green with stainless steel hinges and pentahead locking mechanisms.
- 10) For fault interrupting switches, Type 2 Vacuum Interrupter control including an electronic display for instantaneous current readout and assisted fault locating.

## K. OPTIONS

The following options shall be included:

- 304 stainless steel tank
- 304 stainless steel enclosure
- 25kA or 12.5kA fault interrupting
- Low pressure warning device
- Gas density switch
- Type 3 Vacuum Interrupter control
- External power and trip for vacuum interrupter control
- Voltage indicator with test capability

***G&W offers a complete line of  
load and fault interrupting switchgear  
for underground, padmount and  
overhead systems, including:***



**SF6 Insulated Switchgear**

**SF<sub>6</sub> Gas Insulated Switchgear**

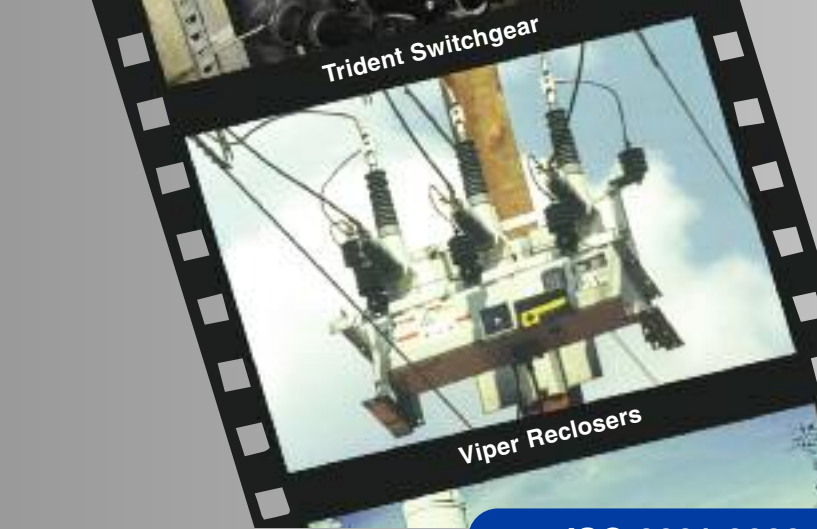
- 15 - 35kV, 630A, up to 25kA sym.
- Two and three position
- Manual or automated
- Compact and dead-front
- Vacuum interrupter or fuse protection



**Trident Switchgear**

**Solid Dielectric Switchgear**

- 15-35kV, 630A, up to 16kA sym.
- Epoxy encapsulated vacuum interrupters
- Single phase and three phase
- Multi-way configurations



**Viper Reclosers**

**Solid Dielectric Vacuum Reclosers**

- 15 - 35kV, 800A, 12.5kA sym.
- Epoxy encapsulated vacuum interrupters
- Three phase and triple option
- Work with multiple controls

**ISO 9001:2000 Certified Company**

**G&W ELECTRIC CO.**  
3500 W. 127th Street  
Blue Island, IL 60406  
(708) 388-5010  
FAX: (708) 388-0755  
Website: [www.gwelec.com](http://www.gwelec.com)  
ISO 14001:2004 Certified Company



Engineered to Order  
Built to Last

**SHANGHAI G&W ELECTRIC LTD.**  
No. 8 Qing Yun Road  
Zhang Jiang Hi-Tech Park  
Pudong, Shanghai, China 201203  
+86-21-5895-8648  
FAX: +86-21-5895-6829  
Website: [www.gwelec.com.cn](http://www.gwelec.com.cn)