# Padmount Style $SF_6$ Insulated Switching Solutions

*Providing load and fault interrupting switching for systems rated through 38kV, 900A continuous, to 25kA symmetrical interrupting*

- Smart Grid / Lazer™ solutions
- Front and front/back access designs
- Dead-front designs
- Compact construction
- Maintenance-free operation
- Two and three position switching
- Mounting flexibility
- Ease of automation

G&W
Engineered to Order
Built to Last

**CATALOG SF6-PS10**
September, 2010

# GENERAL FEATURES

Since 1905, G&W has provided custom power solutions to utilities and electric power users around the world. G&W has a wide selection of reliable, quality switching and fault interrupting products to meet the most stringent customer requirements. Whether the application involves load switching, line sectionalizing, fault interruption or distribution automation, G&W can provide a solution for distribution system switching and protection. When specifying switchgear, consider these features:

## Maximum Operator Safety

$SF_6$ gas is a nontoxic, nonflammable switching dielectric. Dead-front switch construction eliminates any exposed live parts. Spring-assisted mechanisms assure quick-make, quick-break operation. Viewing windows permit visual verification of open or closed contacts. Tamper-resistant enclosures utilize penta-head bolts and padlocking provisions. Motor actuators are available permitting remote operation. The result is maximum operator safety.

## Minimal Maintenance

G&W $SF_6$ switches are corrosion-resistant, totally sealed and factory filled. No more field adjustments of critical contact areas or concerns with environmental contamination or intrusions. A periodic check of the pressure gauge is all that is required. Galvaneal type enclosures assure maximum corrosion resistance.

## Application Versatility

***Multi-way Configurations*** — Switches are available for either two-position or three-position (incorporating an integral ground, tie or test position) switching. Single or multiple sources can feed multiple loads. Bus tie configurations are available permitting multiple sources to feed different loads within the same switch.

***Mounting Flexibility*** — Horizontal and vertical configurations are available with operating apparatus accessible from the front, top or side compartments. Enclosures are removable for easy cable installation or field replacement.

***Bushing Variety*** — Many bushing styles are available including an exclusive disconnectable style permitting field changeout. Cable entry can be bottom, front, back or side.

***Visible Break*** — Load break switches can incorporate a visible break of all three phases.

***Overcurrent Protection*** — Fusing or electronically controlled, resettable vacuum interrupters are available.

***Smart Grid / Lazer Solutions*** — Complete SCADA distribution automation and Smart Grid solutions are available including automatic transfer. G&W's Lazer distribution automation systems provide pre-engineered, time-proven solutions for automatic power restoration.

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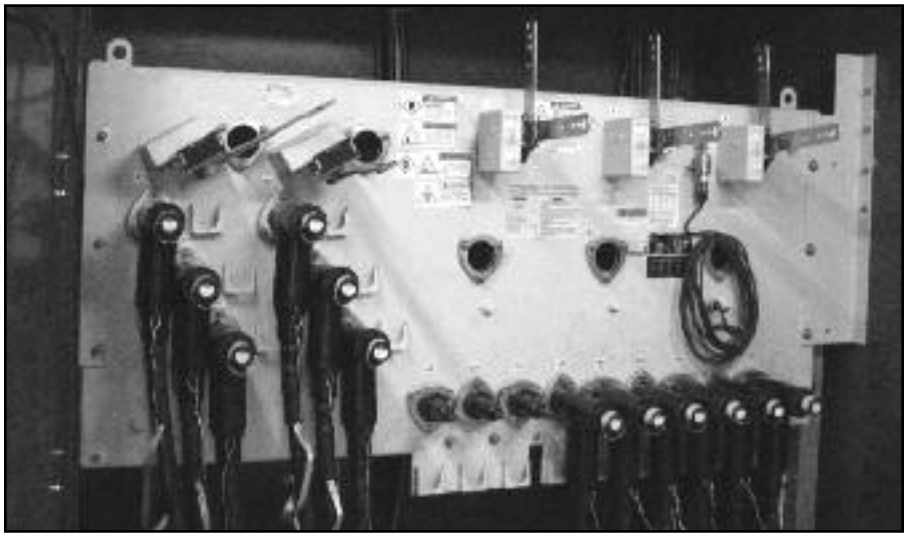
## PUFFER VACUUM INTERRUPTERS

G&W load and fault interrupting combination switches combine the total cost and operating benefits of fuseless, electronically controlled, resettable overcurrent protection with the safety and maintenance benefits of a totally sealed, dead-front, $SF_6$ insulated device. The switches are designed for automatic single or three phase fault interruption with manual load break capabilities for systems through 35kV, 630A continuous. Ratings to 900A continuous are available on certain models. Single side access designs are available for confined space applications.



*PNI single side access switch.*

## FEATURES

***Operator Safety*** — G&W combination switches are totally sealed, dead-front and insulated with nonflammable, nontoxic $SF_6$ gas. Operators are spring assisted for positive quick-make, quick-break operation. A trip-free mechanism permits interruption independent of the operating handle if closing into a fault. Viewing windows permit visible indication of interrupter contact position.

***Minimal Maintenance*** — No more routine inspections or dielectric testing as with oil gear. No more contact contamination, rodent problems or insulator maintenance as with air gear. A periodic check of the gas pressure gauge is all that is required.

***Three Phase Tripping*** — No more single phasing problems. Simultaneous three phase tripping is available through the electronics and with three phase operating handles for manual operation and reset.

***Protection Curve Compatibility*** — G&W solid state electronic controls permit extremely accurate, consistent protection curve characteristics compared to conventional fuses. The exclusive controls can emulate the most common time current curves (TCC) for power fuses, relays and fuse links (oil fuse cutouts). Optional controls can provide ground trip, inrush restraint and adjustable time delay capability.

***Fully Tested*** — Switches are designed and tested per applicable sections of IEEE C37.72, C37.74 C37.60, and IEC 265 standards.

## APPLICATIONS

G&W combination switches provide a direct replacement for power fused air and vacuum-in-oil switchgear. Some ideal applications include:

***Transformer and Motor Protection*** — The three phase trip feature and high continuous current make PVIs ideal for protecting three phase motors and transformers through 600A continuous.

***Loop and Tap Switching*** — Standard 630A and optional 900A loop switching is accomplished using the latest puffer technology. Tap switching through 630A and up to 25kA symmetric fault protection is accomplished using resettable, electronically controlled vacuum interrupters. The vacuum interrupters also function as load break switches.

***Automatic Transfer*** — For critical load applications, switches can be supplied with an automatic transfer control package to provide automatic transfer from one source to another to minimize downtime.

***Smart Grid / Lazer Solutions***— Switches can be supplied with motor actuators on both the line and load side providing remote control capability. Various control packages including portable controls are available.

For Smart Grid applications, G&W works with the top control manufacturers of the industry, including Schweitzer and GE, to match the right control for the job. For automatic power restoration, G&W's Lazer solution provides a pre-engineered, field proven system which can be pre-assembled and factory tested prior to shipment.

***Metalclad Switchgear Replacement*** — Front access designs can provide up to a 900A rated main bus with up to six 25kA symmetric protected load ways for a compact, economical alternative to metalclad and metal enclosed lineups. All switches can be equipped with SEL relays, providing flexibility, as well as complete remote monitoring and control capabilities.

## Two Position, Front Access, Puffer Vacuum Interrupters

### Rotary Puffer (RPFI)

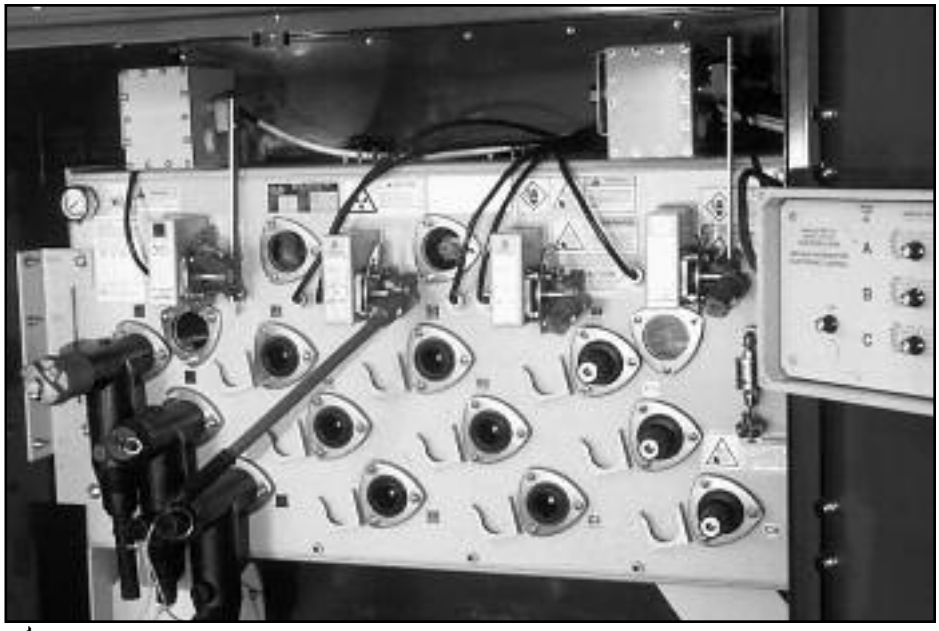
Diagonal bushing configurations. Provides smallest footprint with three phase interrupting.

**Load break switch (RP) ratings**

Maximum design voltage, kV .....15.5.....27
Voltage class, kV .....15 .....25
Impulse level (BIL) kV .....110 .....125
One minute withstand, AC kV .....35 .....60
One minute withstand, Production test rating AC kV .....34 .....40
15 minute withstand, DC kV .....53 .....78
Continuous and load break current, Amps .....630 .....630
Momentary current, kA asym .....25.6.....20
Fault-close current, (3 times) kA asym .....25.6.....20
One second current, kA sym .....16.....12.5
Operations load interrupting endurance (15kV) at 600A .....500 .....350
Mechanical endurance, operations .....2000 ..2000

**Fault interrupter (FI) ratings**

Maximum design voltage, kV .....15.5.....27
Voltage class, kV .....15 .....25
Impulse level (BIL), kV .....110 .....125
One minute withstand, AC kV .....50 .....60
One minute withstand, Production test rating AC kV .....34 .....40
15 minute withstand, DC kV .....53 .....78
Continuous and load break current, Amps .....630 .....630
Symmetrical interrupting rating, kA .....12.5 ....12.5



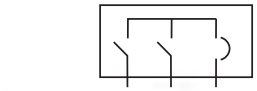
*Automated RPFI-9F shown.*

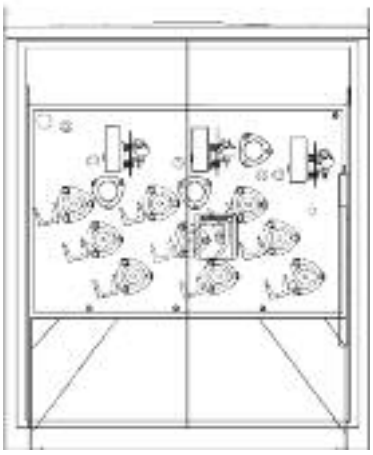
**IEEE C37.60**
**Fault Interrupting Duty**

Total number of fault interruptions: 116

| Percent of Maximum Interrupting Rating | Approx. Interrupting Current, Amps | No. of Fault Interruptions |
|---|---|---|
| 15-20% | 2,000 | 44 |
| 45-55% | 6,000 | 56 |
| 90-100% | 12,500 | 16 |

***Manually operated RPFI-6F shown.***





*Load break operating handle.*

*Fault interrupter operating handle.*


*Fault interrupter position indicator.*

## TWO POSITION, FRONT ACCESS PUFFER VACUUM INTERRUPTERS

**CONTINUED**

### LINEAR PUFFER (LPFI)

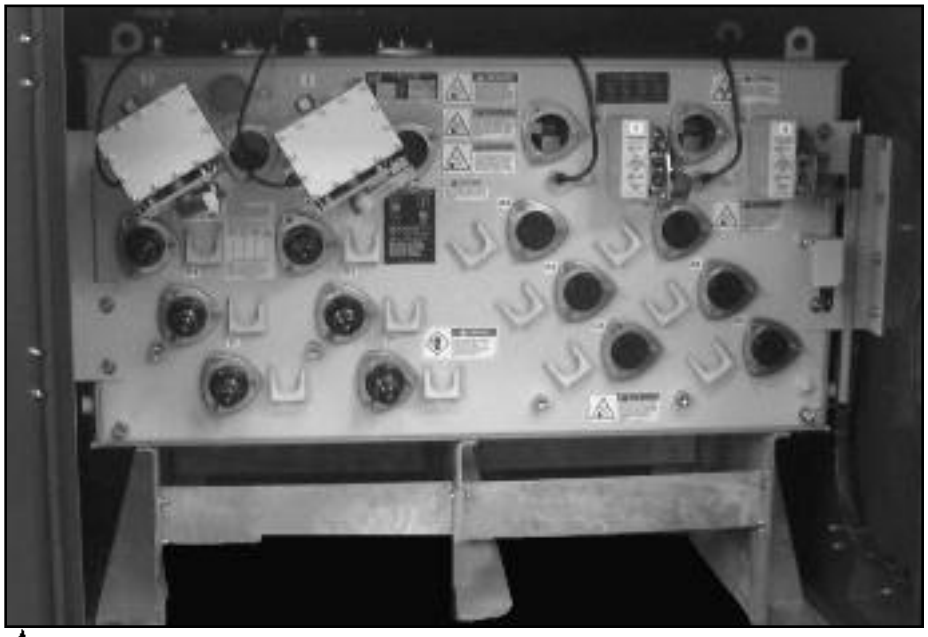
Provides load break switch with visible break and three phase fault interrupting.

**Load break switch (LP) ratings**

Maximum design voltage,
kV .....15.5 .....27 .....38
Voltage class,
kV .....15.....25 .....35
Impulse level (BIL),
kV .....110 .....125 .....150
One minute withstand,
AC kV .....35.....60 .....70
One minute withstand,
Production test rating
AC kV .....34.....40 .....50
15 minute withstand,
DC kV .....53.....78 .....103
Continuous and load break current,
Amps .....630 .....630 .....630
Momentary current,
kA asym .....40.....40 .....40
Fault-close current, (3 times)
kA asym .....40.....40 .....40
One second current,
kA sym .....25.....25 .....25
Open gap withstand,
kV .....200 .....200 .....200
10 operation overload interrupting capability,
Amps .....3000....3000 ..3000
Operations load interrupting at 600A .....1200....1200 ..1200
Mechanical endurance,
operations ....2000....2000 ..2000

**Fault interrupter (FI) ratings**

Voltage class,
kV.....15 .....25
Impulse level (BIL),
kV.....110 .....25
One minute withstand,
AC kV.....50 .....60
One minute withstand,
Production test rating
AC kV.....34 .....40
15 minute withstand,
DC kV .....53 .....78



*Automated LPFI-9F shown.*

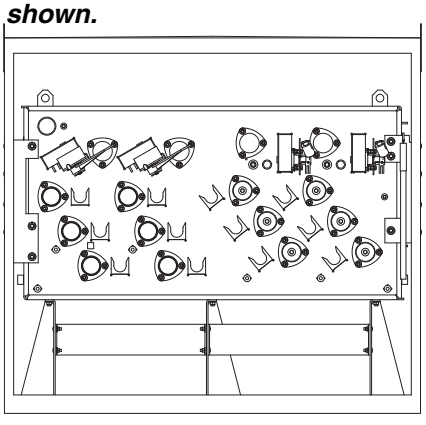
Continuous and load break current,
Amps .....630 .....630
Symmetrical interrupting rating,
kA.....12.5 .....12.5

**IEEE C37.60**
**Fault Interrupting Duty**

Total number of fault interruptions: 116

| Percent of Maximum Interrupting Rating | Approx. Interrupting Current, Amps | No. of Fault Interruptions |
|---|---|---|
| 15-20% | 2,000 | 44 |
| 45-55% | 6,000 | 56 |
| 90-100% | 12,500 | 16 |

***Manually operated LPFI-9F shown.***



*Hookstick operable load break handle.*

*Fault interrupter operating handle.*

*Load break switch visible break.*

## TWO POSITION, FRONT ACCESS, PUFFER VACUUM INTERRUPTERS

**CONTINUED**

### LINEAR PUFFER (PNI)

Provides load break switch visible break with 25kA symmetrical three phase fault interrupting.

**Load break switch (LP) ratings**

Maximum design voltage,
kV .....15.5 .....27.....38
Voltage class,
kV .....15.....25.....35
Impulse level (BIL),
kV .....110 .....125 .....150
One minute withstand,
AC kV .....35.....60.....70
One minute withstand,
Production test rating
AC kV .....34.....40.....50
15 minute withstand,
DC kV .....53.....78.....103
Continuous and load break current,
Amps* .....630 .....630 .....630
Momentary current,
kA asym .....40.....40.....40
Fault-close current, (3 times)
kA asym .....40.....40.....40
One second current,
kA sym .....25.....25.....25
Open gap withstand,
kV .....200 .....200 .....200
10 operation overload interrupting capability,
Amps .....3000....3000....3000
Operations load interrupting
at 600A .....1200....1200....1200
Mechanical endurance,
operations....2000....2000....2000

**900A continuous available*

**Fault interrupter (NI) ratings**

Maximum design voltage,
kV .....15.5.....27 .....38
Voltage class,
kV .....15 .....25 .....35
Impulse level (BIL),
kV .....110.....125 ....150
One minute withstand,
AC kV .....50 .....60 .....70
One minute withstand,
Production test rating
AC kV .....34 .....40 .....50
15 minute withstand,
DC kV .....53 .....78 .....103

▲ *Front access PNI with load break rotary operator and interrupter single operating handle.*

◄ *Optional load break switch rotary operator.*

Continuous and load break current,
Amps.....630.....630 ....630
Symmetrical interrupting rating,
kA .....25 .....25 ..12.5**

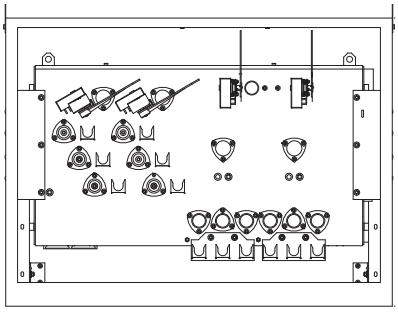
***25kA available*

**IEEE C37.60**
**Fault Interrupting Duty**

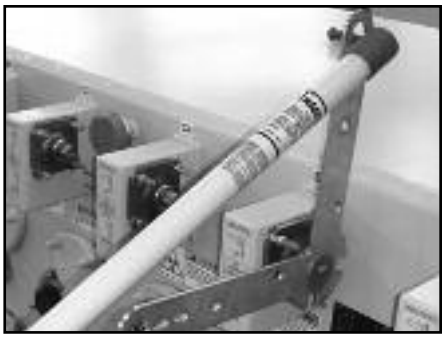
Total number of fault interruptions: 116

| 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 |

***Model PNI-9F***
*Shown with diagonal bushing configuration.*



▲ *Hookstick operable load break handle.*



▲ *Interrupter with dual operating handle.*

▲ *Load break switch visible break.*

## TWO POSITION, FRONT ACCESS, PUFFER VACUUM INTERRUPTERS
**CONTINUED**

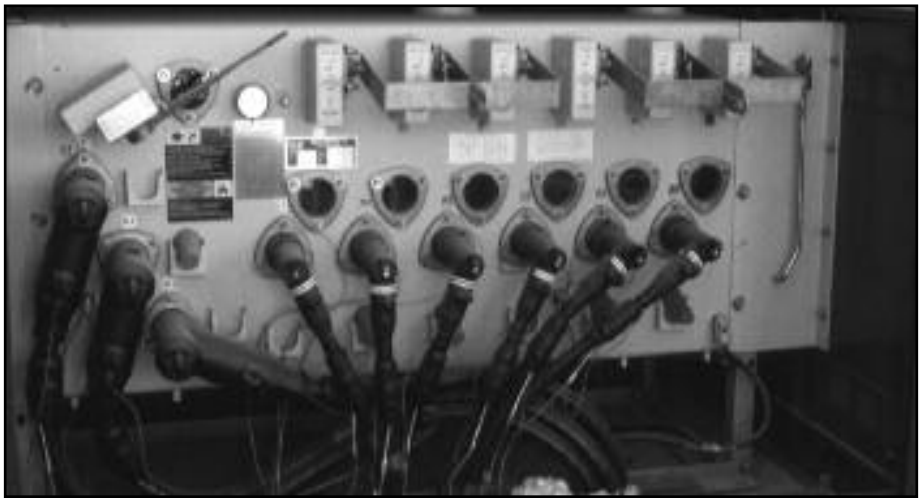
### LINEAR PUFFER (PVI)
Provides load break switch with visible break and single phase or three phase fault interrupting. Fault interrupters can be changed from single phase to three phase operation in the field.

**Load break switch (LP) ratings**

Maximum design voltage,
kV .....15.5.....27 .....38
Voltage class,
kV .....15 .....25 .....35
Impulse level (BIL),
kV .....110.....125 ..150
One minute withstand,
AC kV .....35 .....60 .....70
One minute withstand,
Production test rating
AC kV .....34 .....40 .....50
15 minute withstand,
DC kV .....53 .....78 ....103
Continuous and load break current,
Amps* .....630.....630 ..630
Momentary current,
kA asym .....40 .....40 .....40
Fault-close current, (3 times)
kA asym .....40 .....40 .....40
One second current,
kA sym .....25 .....25 .....25
Open gap withstand,
kV .....200.....200 ..200
10 operation overload interrupting capability,
Amps.....3000....3000 ..3000
Operations load interrupting at 600A .....1200....1200 ..1200
Mechanical endurance,
operations.....2000....2000 ..2000
**900A continuous available*

**Fault interrupter (VI) ratings**

Maximum design voltage,
kV .....15.5.....27 .....38
Voltage class,
kV .....15 .....25 .....35
Impulse level (BIL),
kV .....95.....125....150
One minute withstand,
AC kV .....50 .....60 .....70
One minute withstand,
Production test rating
AC kV .....34 .....40 .....50



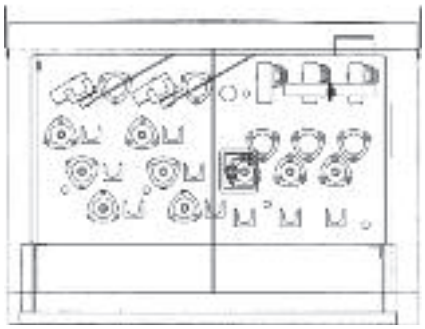
▲ *Model PVI-7F with three phase operating handle shown.*

15 minute withstand,
DC kV .....53 .....78 ....103
Continuous and load break current,
Amps.....630.....630....630
Symmetrical interrupting rating,
kA**.....12 .....12 .....12
***20kA available*

**IEEE C37.60**
**Fault Interrupting Duty**
Total number of fault interruptions: 116

| Percent of Maximum Interrupting Rating | Approx. Interrupting Current, Amps | No. of Fault Interruptions |
|---|---|---|
| 15-20% | 2,000 | 44 |
| 45-55% | 6,000 | 56 |
| 90-100% | 12,000 | 16 |

***Model PVI-6F shown with three phase operating handle***

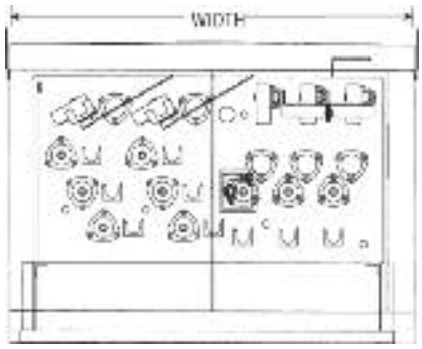


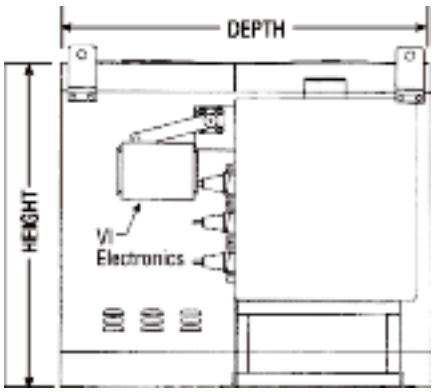
▲ *Hookstick operable load break handle.*

▲ *Single phase interrupter operating handles.*

▲ *Load break switch visible break.*

## TWO POSITION, FRONT ACCESS, PUFFER VACUUM INTERRUPTERS
### CONTINUED



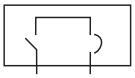
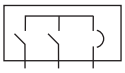
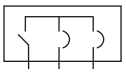
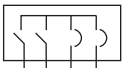

**For typical specifications, go to www.gwelec.com. For contact principle, see pages 32-35.**

**For RPFI styles:*
*height = 59" (1499mm),*
*depth = 49" (1245mm).*

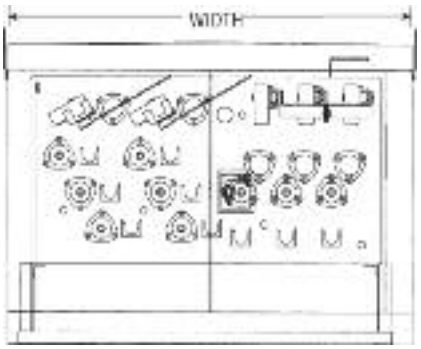
*For LPFI styles:*
*height = 61" (1549mm),*
*depth = 54" (1372mm).*

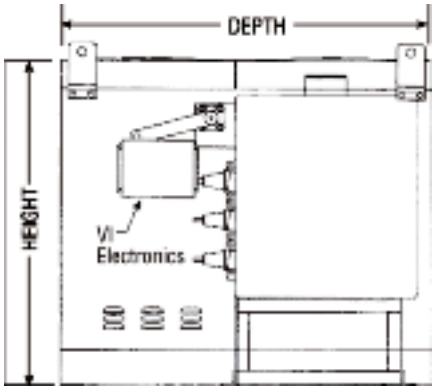
*For PNI styles:*
*height = 65" (1651mm),*
*depth = 55" (1397mm).*

*For PVI styles:*
*height = 57" (1448mm),*
*depth = 54.5" (1384mm).*

| Model | One-line Diagram | Voltage (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
| 4F |  | 15 | PNI20-376-25-4F | 47.5 (1207) | 1500 (682) |
| | | | PFI20-376-12-4F | 38.2 (969) | 1200 (545) |
| | | | PVI20-376-12-4F | 54.8 (1392) | 1600 (727) |
| | | 25 | PNI20-386-25-4F | 47.5 (1207) | 1500 (682) |
| | | | PFI20-386-12-4F | 38.2 (969) | 1200 (545) |
| | | | PVI20-386-12-4F | 54.8 (1392) | 1600 (727) |
| | | 35 | PNI20-396-12-4F | 47.5 (1207) | 1500 (682) |
| | | | PVI20-396-12-4F | 54.8 (1392) | 1600 (727) |
| 5F |  | 15 | RPFI21-376-12-5F | 38.2 (969) | 1200 (545) |
| | | | LPFI21-376-12-5F | 43.5 (1111) | 1475 (670) |
| | | | PNI21-376-25-5F | 47.5 (1207) | 1550 (705) |
| | | | PVI21-376-12-5F | 54.8 (1392) | 1600 (727) |
| | | 25 | RPFI21-386-12-5F | 38.2 (969) | 1200 (545) |
| | | | LPFI21-386-12-5F | 43.5 (1111) | 1475 (670) |
| | | | PNI21-386-25-5F | 47.5 (1207) | 1550 (705) |
| | | | PVI21-386-12-5F | 54.8 (1392) | 1600 (727) |
| | | 35 | PNI21-396-12-5F | 47.5 (1207) | 1550 (705) |
| | | | PVI21-396-12-5F | 61.0 (1549) | 1750 (795) |
| 6F |  | 15 | RPFI32-376-12-6F | 50.1 (1274) | 1500 (681) |
| | | | LPFI32-376-12-6F | 56.3 (1429) | 1775 (807) |
| | | | PNI32-376-25-6F | 62.5 (1588) | 1920 (873) |
| | | | PVI32-376-12-6F | 67.3 (1709) | 1900 (864) |
| | | 25 | RPFI32-386-12-6F | 50.1 (1274) | 1500 (681) |
| | | | LPFI32-386-12-6F | 56.3 (1429) | 1775 (807) |
| | | | PNI32-386-25-6F | 62.5 (1588) | 1920 (873) |
| | | | PVI32-386-12-6F | 67.3 (1709) | 1900 (864) |
| | | 35 | PNI32-396-12-6F | 62.5 (1588) | 1920 (873) |
| | | | PVI32-396-12-6F | 73.5 (1867) | 2050 (932) |
| 7F |  | 15 | RPFI31-376-12-7F | 50.1 (1274) | 1600 (726) |
| | | | LPFI31-376-12-7F | 55.7 (1415) | 2100 (955) |
| | | | PNI31-376-25-7F | 62.5 (1588) | 2050 (932) |
| | | | PVI31-376-12-7F | 75.8 (1925) | 2100 (955) |
| | | 25 | RPFI31-386-12-7F | 50.1 (1274) | 1600 (726) |
| | | | LPFI31-386-12-7F | 55.7 (1415) | 2100 (955) |
| | | | PNI31-386-25-7F | 62.5 (1588) | 2050 (932) |
| | | | PVI31-386-12-7F | 75.8 (1925) | 2100 (955) |
| | | 35 | PNI31-396-12-7F | 62.5 (1588) | 2050 (932) |
| | | | PVI31-396-12-7F | 91.0 (2311) | 2450 (1114) |
| 9F |  | 15 | RPFI42-376-12-9F | 62.1 (1578) | 1800 (817) |
| | | | LPFI42-376-12-9F | 68.3 (1734) | 2100 (955) |
| | | | PNI42-376-25-9F | 77.5 (1969) | 2300 (1045) |
| | | | PVI42-376-12-9F | 88.3 (2242) | 2400 (1091) |
| | | 25 | RPFI42-386-12-9F | 62.1 (1578) | 1800 (817) |
| | | | LPFI42-386-12-9F | 68.3 (1734) | 2100 (955) |
| | | | PNI42-386-25-9F | 77.5 (1969) | 2300 (1045) |
| | | | PVI42-386-12-9F | 88.3 (2242) | 2400 (1091) |
| | | 35 | PNI42-396-12-9F | 77.5 (1969) | 2300 (1045) |
| | | | PVI42-396-12-9F | 103.5 (2629) | 2700 (1227) |

## TWO POSITION, FRONT ACCESS, PUFFER VACUUM INTERRUPTERS
**CONTINUED**




**For typical specifications, go to www.gwelec.com. For contact principle, see pages 32-35.**

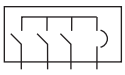
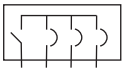
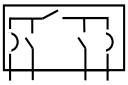
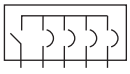
**For RPFI styles:*
*height = 59" (1499mm),*
*depth = 49" (1245mm).*

*For LPFI styles:*
*height = 61" (1549mm),*
*depth = 54" (1372mm).*

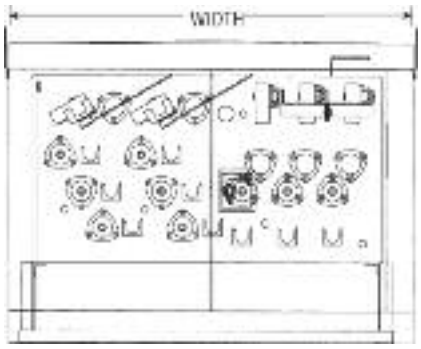
*For PNI styles:*
*height = 65" (1651mm),*
*depth = 55" (1397mm).*

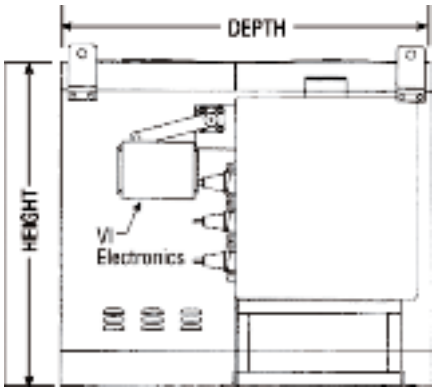
*For PVI styles:*
*height = 57" (1448mm),*
*depth = 54.5" (1384mm).*

## FRONT ACCESS PUFFER VACUUM INTERRUPTERS

| Model | One-line Diagram | Voltage (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
| 11F |  | 15 | RPFI43-376-12-11F | 62.1 (1578) | 1800 (817) |
| | | | LPFI43-376-12-11F | 68.8 (1746) | 2075 (943) |
| | | | PNI43-376-25-11F | 77.5 (1969) | 2400 (1091) |
| | | | PVI43-376-12-11F | 79.8 (2026) | 2200 (1000) |
| | | 25 | RPFI43-386-12-11F | 62.1 (1578) | 1800 (817) |
| | | | LPFI43-386-12-11F | 68.8 (1746) | 2075 (943) |
| | | | PNI43-386-25-11F | 77.5 (1969) | 2400 (1091) |
| | | | PVI43-386-12-11F | 79.8 (2026) | 2200 (1000) |
| | | 35 | PNI43-396-12-11F | 77.5 (1969) | 2400 (1091) |
| | | | PVI43-396-12-11F | 86.0 (2184) | 2450 (1114) |
| 12F |  | 15 | RPFI41-376-12-12F | 62.1 (1578) | 1800 (817) |
| | | | LPFI41-376-12-12F | 67.8 (1721) | 2150 (977) |
| | | | PNI41-376-25-12F | 77.5 (1969) | 2400 (1091) |
| | | | PVI41-376-12-12F | 96.8 (2459) | 2600 (1182) |
| | | 25 | RPFI41-386-12-12F | 62.1 (1578) | 1800 (817) |
| | | | LPFI41-386-12-12F | 67.8 (1721) | 2150 (977) |
| | | | PNI41-386-25-12F | 77.5 (1969) | 2400 (1091) |
| | | | PVI41-386-12-12F | 95.0 (2413) | 2600 (1182) |
| | | 35 | PNI41-396-12-12F | 77.5 (1969) | 2400 (1091) |
| | | | PVI41-396-12-12F | 121.0 (3073) | 3000 (1364) |
| 43F |  **Bus Tie** | 15 | RPFI43-376-12-43F | 74.1 (1883) | 2100 (953) |
| | | | LPFI43-376-12-43F | 80.2 (2037) | 2300 (1045) |
| | | | PNI43-376-25-43F | 92.5 (2350) | 2750 (1250) |
| | | | PVI43-376-12-43F | 101 (2565) | 2700 (1227) |
| | | 25 | RPFI43-386-12-43F | 74.2 (1885) | 2250 (1023) |
| | | | LPFI43-386-12-43F | 80.2 (2037) | 2300 (1045) |
| | | | PNI43-386-25-43F | 92.5 (2350) | 2750 (1250) |
| | | | PVI43-386-12-43F | 101 (2565) | 2700 (1227) |
| | | 35 | PNI43-396-12-43F | 92.5 (2350) | 2750 (1250) |
| | | | PVI43-396-12-43F | 116 (2946) | 3000 (1364) |
| 51F |  | 15 | RPFI51-376-12-51F | 74.1 (1883) | 2300 (1044) |
| | | | LPFI51-376-12-51F | 79.7 (2025) | 2600 (1182) |
| | | | PNI51-376-25-51F | 92.5 (2350) | 2900 (1318) |
| | | | PVI51-376-12-51F | 118 (2997) | 3100 (1409) |
| | | 25 | RPFI51-386-12-51F | 74.2 (1885) | 2250 (1023) |
| | | | LPFI51-386-12-51F | 79.7 (2025) | 2600 (1182) |
| | | | PNI51-386-25-51F | 92.5 (2350) | 2900 (1318) |
| | | | PVI51-386-12-51F | 118 (2997) | 3100 (1409) |
| | | 35 | PNI51-396-12-51F | 92.5 (2350) | 2900 (1318) |
| | | | PVI51-396-12-51F | 151 (3835) | 3600 (1636) |

## TWO POSITION, FRONT ACCESS, PUFFER VACUUM INTERRUPTERS
**CONTINUED**




**For typical specifications, go to www.gwelec.com. For contact principle, see pages 32-35.**

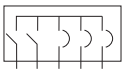
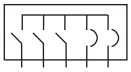
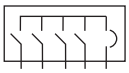
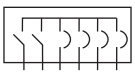
**For RPFI styles:*
*height = 59" (1499mm),*
*depth = 49" (1245mm).*

*For LPFI styles:*
*height = 61" (1549mm),*
*depth = 54" (1372mm).*

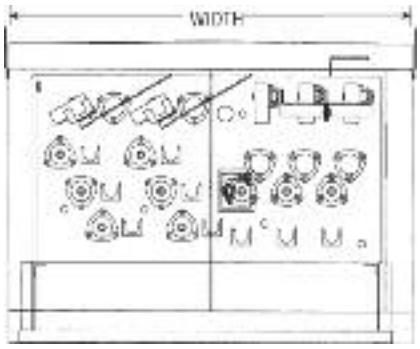
*For PNI styles:*
*height = 65" (1651mm),*
*depth = 55" (1397mm).*

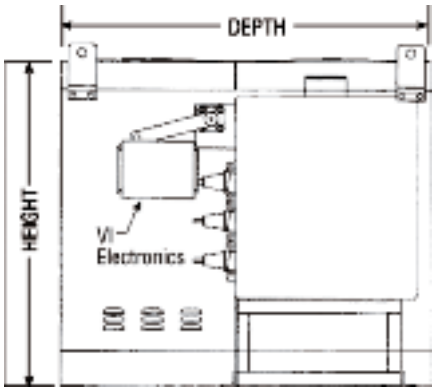
*For PVI styles:*
*height = 57" (1448mm),*
*depth = 54.5" (1384mm).*

## FRONT ACCESS PUFFER VACUUM INTERRUPTERS

| Model | One-line Diagram | Voltage (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
| 52F |  | 15 | RPFI52-376-12-52F | 74.1 (1883) | 2100 (953) |
| | | | LPFI52-376-12-52F | 80.3 (2038) | 2525 (1148) |
| | | | PNI52-376-25-52F | 92.5 (2350) | 2800 (1273) |
| | | | PVI52-376-12-52F | 109.3 (2776) | 2900 (1318) |
| | | 25 | RPFI52-386-12-52F | 74.1 (1883) | 2100 (953) |
| | | | LPFI52-386-12-52F | 80.3 (2038) | 2525 (1148) |
| | | | PNI52-386-25-52F | 92.5 (2350) | 2800 (1273) |
| | | | PVI52-386-12-52F | 109.3 (2775) | 2900 (1318) |
| | | 35 | PNI52-396-12-52F | 92.5 (2350) | 2800 (1273) |
| | | | PVI52-396-12-52F | 133.5 (3391) | 3250 (1477) |
| 53F |  | 15 | RPFI53-376-12-53F | 74.1 (1883) | 2100 (953) |
| | | | LPFI53-376-12-53F | 80.8 (2051) | 2450 (1114) |
| | | | PNI53-376-25-53F | 92.5 (2350) | 2750 (1250) |
| | | | PVI53-376-12-53F | 101 (2565) | 2700 (1227) |
| | | 25 | RPFI53-386-12-53F | 74.1 (1883) | 2100 (953) |
| | | | LPFI53-386-12-53F | 80.8 (2051) | 2450 (1114) |
| | | | PNI53-386-25-53F | 92.5 (2350) | 2750 (1250) |
| | | | PVI53-386-12-53F | 101 (2565) | 2700 (1227) |
| | | 35 | PNI53-396-12-53F | 92.5 (2350) | 2750 (1250) |
| | | | PVI53-396-12-53F | 116 (2946) | 3000 (1364) |
| 54F |  | 15 | RPFI54-376-12-54F | 74.1 (1883) | 2000 (908) |
| | | | LPFI54-376-12-54F | 81.3 (2064) | 2400 (1091) |
| | | | PNI54-376-25-54F | 92.5 (2350) | 2650 (1205) |
| | | | PVI54-376-12-54F | 93 (2362) | 2500 (1136) |
| | | 25 | RPFI54-386-12-54F | 74.1 (1883) | 2000 (908) |
| | | | LPFI54-386-12-54F | 81.3 (2064) | 2400 (1091) |
| | | | PNI54-386-25-54F | 92.5 (2350) | 2650 (1205) |
| | | | PVI54-386-12-54F | 93 (2362) | 2500 (1136) |
| | | 35 | PNI54-396-12-54F | 92.5 (2350) | 2650 (1205) |
| | | | PVI54-396-12-54F | 98.5 (2502) | 2700 (1227) |
| 62F |  | 15 | RPFI62-376-12-62F | 86.1 (2188) | 2400 (1089) |
| | | | LPFI62-376-12-62F | 92.3 (2343) | 2800 (1273) |
| | | | PNI62-376-25-62F | 107.5 (2731) | 3300 (1500) |
| | | | PVI62-376-12-62F | 130.3 (3308) | 3400 (1545) |
| | | 25 | RPFI62-386-12-62F | 86.1 (2188) | 2400 (1089) |
| | | | LPFI62-386-12-62F | 92.3 (2343) | 2800 (1273) |
| | | | PNI62-386-25-62F | 107.5 (2731) | 3300 (1500) |
| | | | PVI62-386-12-62F | 130.3 (3310) | 3400 (1545) |
| | | 35 | PNI62-396-12-62F | 107.5 (2731) | 3300 (1500) |

## TWO POSITION, FRONT ACCESS, PUFFER VACUUM INTERRUPTERS
**CONTINUED**




**For typical specifications, go to www.gwelec.com. For contact principle, see pages 32-35.**

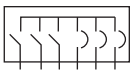
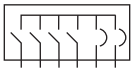
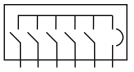
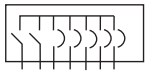
**For RPFI styles:*
*height = 59" (1499mm),*
*depth = 49" (1245mm).*

*For LPFI styles:*
*height = 61" (1549mm),*
*depth = 54" (1372mm).*

*For PNI styles:*
*height = 65" (1651mm),*
*depth = 55" (1397mm).*

*For PVI styles:*
*height = 57" (1448mm),*
*depth = 54.5" (1384mm).*

## FRONT ACCESS PUFFER VACUUM INTERRUPTERS

| Model | One-line Diagram | Voltage (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
| 63F |  | 15 | RPFI63-376-12-63F | 86.1 (2188) | 2400 (1089) |
| | | | LPFI63-376-12-63F | 92.8 (2356) | 2750 (1250) |
| | | | PNI63-376-25-63F | 107.5 (2731) | 3200 (1455) |
| | | | PVI63-376-12-63F | 122 (3099) | 3200 (1455) |
| | | 25 | RPFI63-386-12-63F | 86.1 (2188) | 2400 (1089) |
| | | | LPFI63-386-12-63F | 92.8 (2356) | 2750 (1250) |
| | | | PNI63-386-25-63F | 107.5 (2731) | 3200 (1455) |
| | | | PVI63-386-12-63F | 122 (3099) | 3200 (1455) |
| | | 35 | PNI63-396-12-63F | 107.5 (2731) | 3200 (1455) |
| | | | PVI63-396-12-63F | 146 (3708) | 3600 (1636) |
| 64F |  | 15 | RPFI64-376-12-64F | 86.1 (2188) | 2300 (1044) |
| | | | LPFI64-376-12-64F | 93.3 (2369) | 2700 (1227) |
| | | | PNI64-376-25-64F | 107.5 (2731) | 3100 (1409) |
| | | | PVI64-376-12-64F | 113 (2870) | 3000 (1364) |
| | | 25 | RPFI64-386-12-64F | 86.1 (2188) | 2300 (1044) |
| | | | LPFI64-386-12-64F | 93.3 (2369) | 2700 (1227) |
| | | | PNI64-386-25-64F | 107.5 (2731) | 3100 (1409) |
| | | | PVI64-386-12-64F | 113 (2870) | 3000 (1364) |
| | | 35 | PNI64-396-12-64F | 107.5 (2731) | 3100 (1409) |
| | | | PVI64-396-12-64F | 129 (3277) | 3300 (1500) |
| 65F |  | 15 | RPFI65-376-12-65F | 86.1 (2188) | 2300 (1044) |
| | | | LPFI65-376-12-65F | 93.7 (2381) | 2650 (1205) |
| | | | PNI65-376-25-65F | 107.5 (2731) | 3000 (1364) |
| | | | PVI65-376-12-65F | 105 (2667) | 2800 (1273) |
| | | 25 | RPFI65-386-12-65F | 86.1 (2188) | 2300 (1044) |
| | | | LPFI65-386-12-65F | 93.7 (2381) | 2650 (1205) |
| | | | PNI65-386-25-65F | 107.5 (2731) | 3000 (1364) |
| | | | PVI65-386-12-65F | 105 (2667) | 2800 (1273) |
| | | 35 | PNI65-396-12-65F | 107.5 (2731) | 3000 (1364) |
| | | | PVI65-396-12-65F | 111 (2819) | 3000 (1364) |
| 72F |  | 15 | RPFI72-376-12-72F | 98.1 (2493) | 2500 (1136) |
| | | | LPFI72-376-12-72F | 104.3 (2648) | 3100 (1409) |
| | | | PNI72-376-25-72F | 122.5 (3112) | 3850 (1750) |
| | | | PVI72-376-12-72F | 151.3 (3842) | 3850 (1750) |
| | | 25 | RPFI72-386-12-72F | 98.1 (2493) | 2500 (1136) |
| | | | LPFI72-386-12-72F | 104.3 (2648) | 3100 (1409) |
| | | | PNI72-386-25-72F | 122.5 (3112) | 3850 (1750) |
| | | | PVI72-386-12-72F | 151.3 (3842) | 3850 (1750) |
| | | 35 | PNI72-396-12-72F | 122.5 (3112) | 3850 (1750) |

## TWO POSITION, FRONT / BACK ACCESS, PVI STYLE, PUFFER VACUUM INTERRUPTERS

Provides front and back compartments for separating source and tap cables. Load break switch operating mechanisms are located on the sides of the switch. Fault interrupters can be changed from single phase to three phase protection in the field. Provides load break switch visible break with 12 or 20kA symmetrical single or three phase fault interrupting.

**Load break switch (LP) ratings**

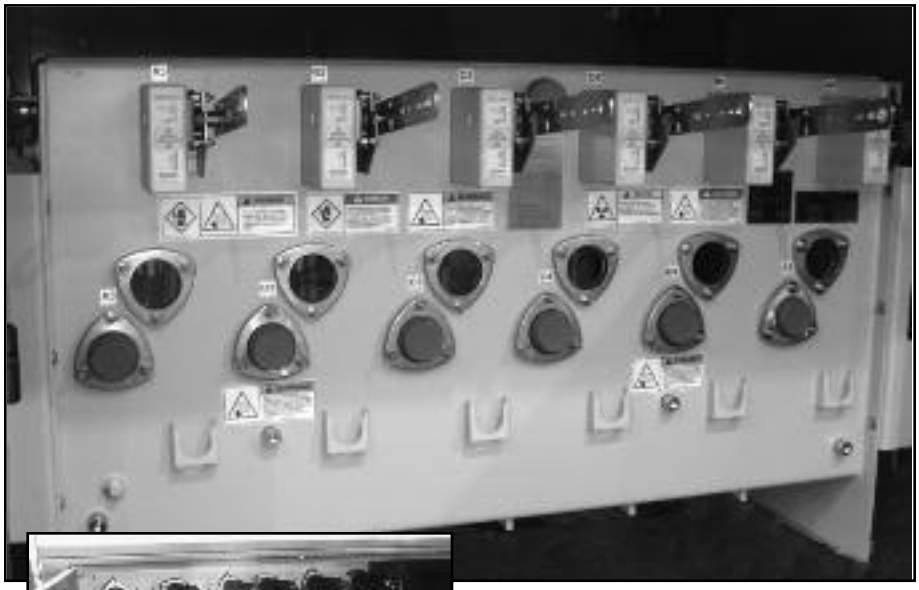
Maximum design voltage,
kV .....15.5.....27 .....38
Voltage class,
kV .....15 .....25 .....35
Impulse level (BIL),
kV .....110.....125.....150
One minute withstand,
AC kV .....35 .....60 .....70
One minute withstand,
Production test rating
AC kV .....34 .....40 .....50
15 minute withstand,
DC kV .....53 .....78 .....103
Continuous and load break current,
Amps* .....630.....630.....630
Momentary current,
kA asym .....40 .....40 .....40
Fault-close current, (3 times)
kA asym .....40 .....40 .....40
One second current,
kA sym .....25 .....25 .....25
Open gap withstand,
kV .....200.....200.....200
10 operation overload interrupting capability,
Amps .....3000 ..3000 ..3000
Operations load interrupting at 600A .....1200 ..1200 ..1200
Mechanical endurance,
operations....2000 ..2000 ..2000

**900A continuous available*

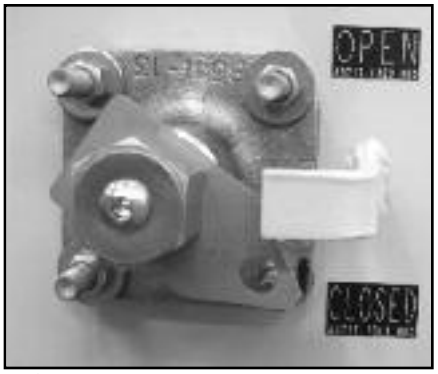
**Fault interrupter (VI) ratings**

Maximum design voltage,
kV .....15.5 ....27.....38
Voltage class,
kV .....15.....25.....35
Impulse level (BIL),
kV .....95 .....125 ....150
One minute withstand,
AC kV .....50.....60.....70
One minute withstand,
Production test rating
AC kV .....34.....40.....50
15 minute withstand,
DC kV .....53.....78.....103
Continuous and load break current,
Amps .....630 ....630 ....630
Symmetrical interrupting rating,
kA** .....12.....12.....12

***20kA available*



▲ *Model PVI-9 front and back views.*




▲ *Load break rotary operator.*

▲ *All load break switch operators are located on the side of the switch.*

▲ *Load break switch visible break.*

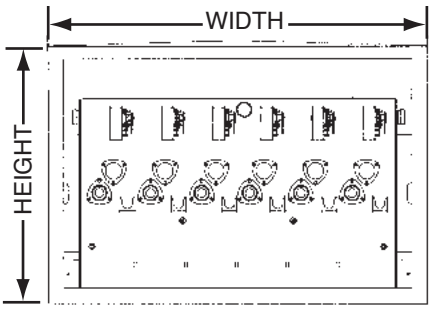
**IEEE C37.60**
**Fault Interrupting Duty**

Total number of fault interruptions: 116

| Percent of Maximum Interrupting Rating | Approx. Interrupting Current, Amps | No. of Fault Interruptions |
|---|---|---|
| 15-20% | 2,000 | 44 |
| 45-55% | 6,000 | 56 |
| 90-100% | 12,000 | 16 |

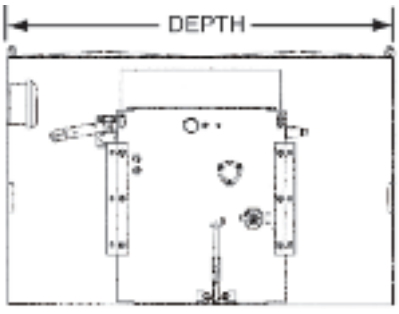
## TWO POSITION, FRONT / BACK ACCESS, PVI STYLE, PUFFER VACUUM INTERRUPTERS CONTINUED

**For typical specifications, go to www.gwelec.com. For contact principle, see pages 33 and 36.**



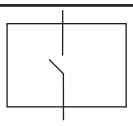
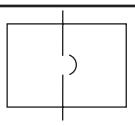
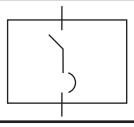
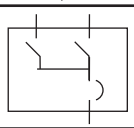
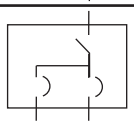
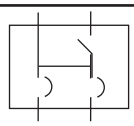
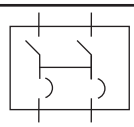
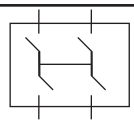
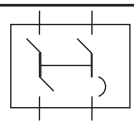
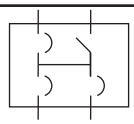
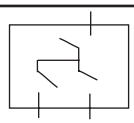
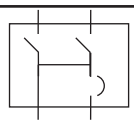

FRONT
*VI operating handles and entrances*

BACK
*Source side cable entrances*




SIDE
*Source side operating compartment*

## FRONT / BACK ACCESS PVI PUFFER VACUUM INTERRUPTERS

| Model | One-line Diagram | Voltage Class (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Depth in. (mm) | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|---|
| 3 |  | 15 | PPI21-376-40-3 | 44.5 (1130) | 79 (2007) | 950 (432) |
| | | 25 | PPI21-386-40-3 | 44.5 (1130) | 79 (2007) | 950 (432) |
| | | 35 | PPI21-396-40-3 | 44.5 (1130) | 79 (2007) | 950 (432) |
| 4 |  | 15 | PVI20-376-12-4 | 44.5 (1130) | 79 (2007) | 950 (432) |
| | | 25 | PVI20-386-12-4 | 44.5 (1130) | 79 (2007) | 950 (432) |
| | | 35 | PVI20-396-12-4 | 44.5 (1130) | 79 (2007) | 950 (432) |
| 5 |  | 15 | PVI21-376-12-5 | 44.5 (1130) | 79 (2007) | 950 (432) |
| | | 25 | PVI21-386-12-5 | 44.5 (1130) | 79 (2007) | 950 (432) |
| | | 35 | PVI21-396-12-5 | 44.5 (1130) | 79 (2007) | 950 (432) |
| 6 |  | 15 | PVI32-376-12-6 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| | | 25 | PVI32-386-12-6 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| | | 35 | PVI32-396-12-6 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| 7 |  | 15 | PVI31-376-12-7 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| | | 25 | PVI31-386-12-7 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| | | 35 | PVI31-396-12-7 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| 8 |  | 15 | PVI41-376-12-8 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| | | 25 | PVI41-386-12-8 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| | | 35 | PVI41-396-12-8 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| 9 |  | 15 | PVI42-376-12-9 | 74.0 (1880) | 79 (2007) | 2300 (1043) |
| | | 25 | PVI42-386-12-9 | 74.0 (1880) | 79 (2007) | 2300 (1043) |
| | | 35 | PVI42-396-12-9 | 74.0 (1880) | 79 (2007) | 2300 (1043) |
| 10 |  | 15 | PPI44-376-40-10 | 74.0 (1880) | 79 (2007) | 2200 (998) |
| | | 25 | PPI44-386-40-10 | 74.0 (1880) | 79 (2007) | 2200 (998) |
| | | 35 | PPI44-396-40-10 | 74.0 (1880) | 79 (2007) | 2200 (998) |
| 11 |  | 15 | PVI43-376-12-11 | 74.0 (1880) | 79 (2007) | 2400 (1091) |
| | | 25 | PVI43-386-12-11 | 74.0 (1880) | 79 (2007) | 2400 (1091) |
| | | 35 | PVI43-396-12-11 | 74.0 (1880) | 79 (2007) | 2400 (1091) |
| 12 |  | 15 | PVI41-376-12-12 | 74.0 (1880) | 79 (2007) | 2400 (1091) |
| | | 25 | PVI41-386-12-12 | 74.0 (1880) | 79 (2007) | 2400 (1091) |
| | | 35 | PVI41-396-12-12 | 74.0 (1880) | 79 (2007) | 2400 (1091) |
| 13 |  | 15 | PPI33-376-40-13 | 74.0 (1880) | 79 (2007) | 2350 (1066) |
| | | 25 | PPI33-386-40-13 | 74.0 (1880) | 79 (2007) | 2350 (1066) |
| | | 35 | PPI33-396-40-13 | 74.0 (1880) | 79 (2007) | 2350 (1066) |
| 14 |  | 15 | PVI42-376-12-14 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| | | 25 | PVI42-386-12-14 | 74.0 (1880) | 79 (2007) | 2250 (1023) |
| | | 35 | PVI42-396-12-14 | 74.0 (1880) | 79 (2007) | 2250 (1023) |

**Enclosure height is 50" (1270mm).*

## TWO POSITION, FRONT / BACK ACCESS, PNI-L STYLE, PUFFER VACUUM INTERRUPTERS

Provides front and back compartments for separating all operating mechanisms from the source and tap cables. Provides load break switch visible break with 25kA symmetrical interrupting.

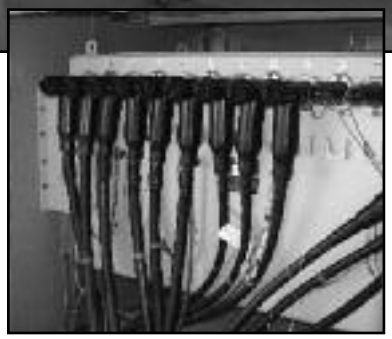
**Load break switch (LP) ratings**

Maximum design voltage,
kV .....15.5 .....27 .....38
Voltage class,
kV .....15.....25 .....35
Impulse level (BIL),
kV .....110 .....125.....150
One minute withstand,
AC kV .....35.....60 .....70
One minute withstand,
Production test rating
AC kV .....34.....40 .....50
15 minute withstand,
DC kV .....53.....78 .....103
Continuous and load break current,
Amps* .....630 .....630.....630
Momentary current,
kA asym .....40.....40 .....40
Fault-close current, (3 times)
kA asym .....40.....40 .....40
One second current,
kA sym .....25.....25 .....25
Open gap withstand,
kV .....200 .....200.....200
10 operation overload interrupting capability,
Amps.....3000....3000 ..3000
Operations load interrupting
at 600A .....1200....1200 ..1200
Mechanical endurance,
operations .....2000....2000 ..2000

**900A continuous available*

**Fault interrupter (NI) ratings**

Maximum design voltage,
kV .....15.5 .....27 .....38
Voltage class,
kV .....15.....25 .....35
Impulse level (BIL),
kV .....110 .....125.....150



▲ *Front and back view of a padmount PNI-43L with rotary style load break operator.*

One minute withstand,
AC kV .....50.....60 .....70
One minute withstand,
Production test rating
AC kV .....34.....40 .....50
15 minute withstand,
DC kV .....53.....78 .....103
Continuous and load break current,
Amps.....630 .....630.....630
Symmetrical interrupting rating,
kA** .....12.5 ....12.5 ....12.5

***25kA available*

**IEEE C37.60**
**Fault Interrupting Duty**

Total number of fault interruptions: 116

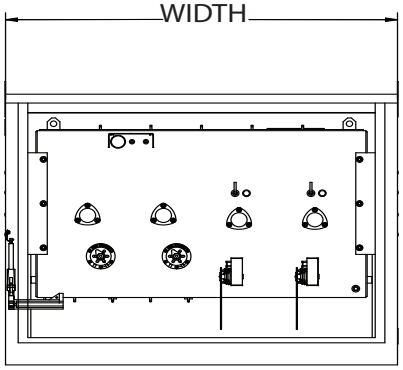
| Percent of Maximum Interrupting Rating | Approx. Interrupting Current, Amps | No. of Fault Interruptions |
|---|---|---|
| 15-20% | 5,000 | 44 |
| 45-55% | 12,500 | 56 |
| 90-100% | 25,000 | 16 |

▲ *Optional load break rotary style operator.*

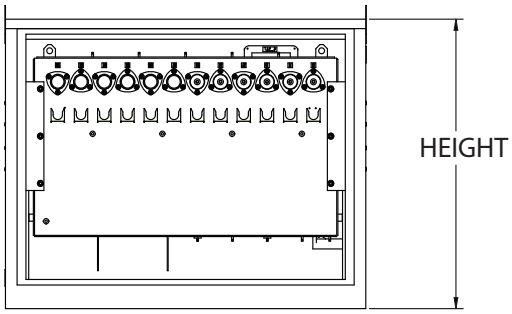
▲ *Interrupter with dual operating handle.*

▲ *Load break switch visible break.*

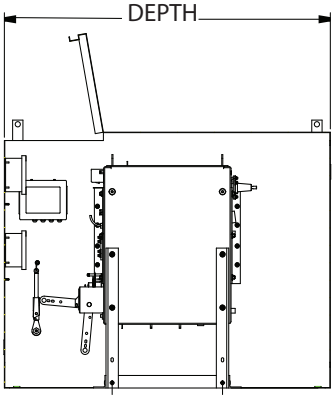
## TWO POSITION, FRONT / BACK ACCESS, PNI-L STYLE, PUFFER VACUUM INTERRUPTERS CONTINUED




FRONT VIEW

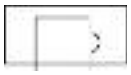
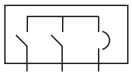
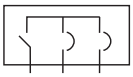
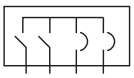
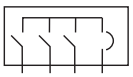
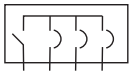
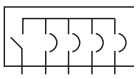
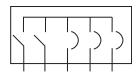
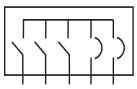
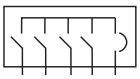
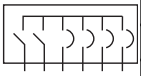
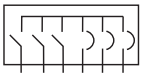
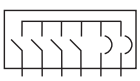
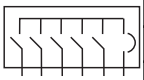
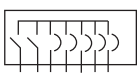



BACK VIEW




**For typical specifications, go to www.gwelec.com. For contact principle, see pages 32 and 35.**

**Height = 65" (1651mm), Depth = 55" (1397mm). Bushing height is 48" (1224mm).*

| Model | One-Line Diagram | Voltage (kV) | Catalog Number | Approximate | |
|---|---|---|---|---|---|
| | | | | Width in. (mm)* | Wt. w/$SF_6$ lbs (kg) |
| 4 |  | 15 | PNI20-376-12-4L | 47.5 (1206) | 1650 (750) |
| | | 25 | PNI20-386-12-4L | | |
| | | 35 | PNI20-396-12-4L | | |
| 6 |  | 15 | PNI32-376-12-6L | 62.5 (1588) | 2050 (932) |
| | | 25 | PNI32-386-12-6L | | |
| | | 35 | PNI32-396-12-6L | | |
| 7 |  | 15 | PNI31-376-12-7L | | |
| | | 25 | PNI31-386-12-7L | | |
| | | 35 | PNI31-396-12-7L | | |
| 9 |  | 15 | PNI42-376-12-9L | 77.5 (1969) | 2500 (1136) |
| | | 25 | PNI42-386-12-9L | | |
| | | 35 | PNI42-396-12-9L | | |
| 11 |  | 15 | PNI43-376-12-11L | | |
| | | 25 | PNI43-386-12-11L | | |
| | | 35 | PNI43-396-12-11L | | |
| 12 |  | 15 | PNI41-376-12-12L | | |
| | | 25 | PNI41-386-12-12L | | |
| | | 35 | PNI41-396-12-12L | | |
| 51 |  | 15 | PNI51-376-12-51L | 92.5 (2350) | 2900 (1318) |
| | | 25 | PNI51-386-12-51L | | |
| | | 35 | PNI51-396-12-51L | | |
| 52 |  | 15 | PNI52-376-12-52L | | |
| | | 25 | PNI52-386-12-52L | | |
| | | 35 | PNI52-396-12-52L | | |
| 53 |  | 15 | PNI53-376-12-53L | | |
| | | 25 | PNI53-386-12-53L | | |
| | | 35 | PNI53-396-12-53L | | |
| 54 |  | 15 | PNI54-376-12-54L | | |
| | | 25 | PNI54-386-12-54L | | |
| | | 35 | PNI54-396-12-54L | | |
| 62 |  | 15 | PNI62-376-12-62L | 107.5 (2731) | 3350 (1522) |
| | | 25 | PNI62-386-12-62L | | |
| | | 35 | PNI62-396-12-62L | | |
| 63 |  | 15 | PNI63-376-12-63L | | |
| | | 25 | PNI63-386-12-63L | | |
| | | 35 | PNI63-396-12-63L | | |
| 64 |  | 15 | PNI64-376-12-64L | | |
| | | 25 | PNI64-386-12-64L | | |
| | | 35 | PNI64-396-12-64L | | |
| 65 |  | 15 | PNI65-376-12-65L | | |
| | | 25 | PNI65-386-12-65L | | |
| | | 35 | PNI65-396-12-65L | | |
| 72 |  | 15 | PNI72-376-12-72L | 122.5 (3111) | 4000 (1818) |
| | | 25 | PNI72-386-12-72L | | |
| | | 35 | PNI72-396-12-72L | | |

## THREE POSITION, FRONT ACCESS, TRIAD™ SERIES 1 WITH LOAD BREAK GROUND SWITCHES

Switches incorporate rotary puffer style internal ground for the load break switch ways. Two models offer different ratings and vacuum interrupter capabilities as follows:

**Model TFI**
Provides three phase protection.

**Load break switch (RP) ratings**
Maximum design voltage,
kV .....15.5 .....27
Voltage class,
kV .....15 .....25
Impulse level (BIL),
kV .....110 .....125
One minute withstand,
AC kV .....35 .....60
One minute withstand,
Production test rating
AC kV .....34 .....40
15 minute withstand,
DC kV .....53 .....78
Continuous and load break current,
Amps .....630 .....630
Momentary current,
kA asym .....40 .....40
Fault-close current, (3 times)
kA asym .....32 .....32
One second current
kA sym .....25 .....25
Mechanical endurance,
operations .....2000 .....2000

**Fault interrupter (FI) ratings**
Maximum design voltage,
kV .....15.5 .....27
Voltage class,
kV .....15 .....25
Impulse level (BIL),
kV .....110 .....125
One minute withstand,
AC kV .....50 .....60
One minute withstand,
Production test rating
AC kV .....34 .....40
15 minute withstand,
DC kV .....53 .....78
Continuous and load break current,
Amps .....630 .....630
Symmetrical interrupting rating,
kA .....12.5 .....12.5

*TFI-6F shown.*

**IEEE C37.60**
**Fault Interrupting Duty**
Total number of fault interruptions: 116

| Percent of Maximum Interrupting Rating | Approx. Interrupting Current, Amps | No. of Fault Interruptions |
|---|---|---|
| 15-20% | 2,000 | 44 |
| 45-55% | 6,000 | 56 |
| 90-100% | 12,500 | 16 |

*Load break multi-position switch operator.*

*Fault interrupter operating handle.*

## THREE POSITION, FRONT ACCESS, TRIAD™ SERIES 1 WITH LOAD BREAK GROUND SWITCHES CONTINUED

Switches incorporate rotary puffer style internal ground for the load break switch ways.

**Model TVI**
Provides single phase or three phase protection, with 12 or 20kA symmetrical interrupting.

**Load break switch (RP) ratings**
Maximum design voltage,
kV .....15.5 .....27 .....38
Voltage class,
kV .....15.....25 .....35
Impulse level (BIL),
kV .....110 .....125 .....150
One minute withstand,
AC kV .....35.....60 .....70
One minute withstand,
Production test rating
AC kV .....34.....40 .....50
15 minute withstand,
DC kV .....53.....78 .....103
Continuous and load break current,
Amps.....630 .....630 .....630
Momentary current,
kA asym .....40.....40 .....40
Fault-close current, (3 times)
kA asym .....32.....32 .....32
One second current
kA sym .....20.....20 .....20
Mechanical endurance,
operations .....2000....2000 ..2000

**Fault interrupter (VI) ratings**
Maximum design voltage,
kV .....15.5 .....27 .....38
Voltage class,
kV .....15.....25 .....35
Impulse level (BIL),
kV .....95 .....125 .....150
One minute withstand,
AC kV .....50.....60 .....70
One minute withstand,
Production test rating
AC kV .....34.....40 .....50
15 minute withstand,
DC kV .....53.....78 .....103

*TVI-52 shown.*

Continuous and load break current,
Amps.....630 .....630 .....630
Symmetrical interrupting rating,
kA**.....12.....12 .....12
***20kA available*

**IEEE C37.60**
**Fault Interrupting Duty**
Total number of fault interruptions: 116

| Percent of Maximum Interrupting Rating | Approx. Interrupting Current, Amps | No. of Fault Interruptions |
|---|---|---|
| 15-20% | 2,000 | 44 |
| 45-55% | 6,000 | 56 |
| 90-100% | 12,000 | 16 |

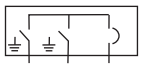
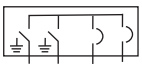
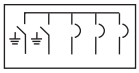
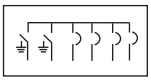
*Load break multi-position switch operator.*

*Single phase interrupter operating handles.*

*Three phase interrupter operating handle.*

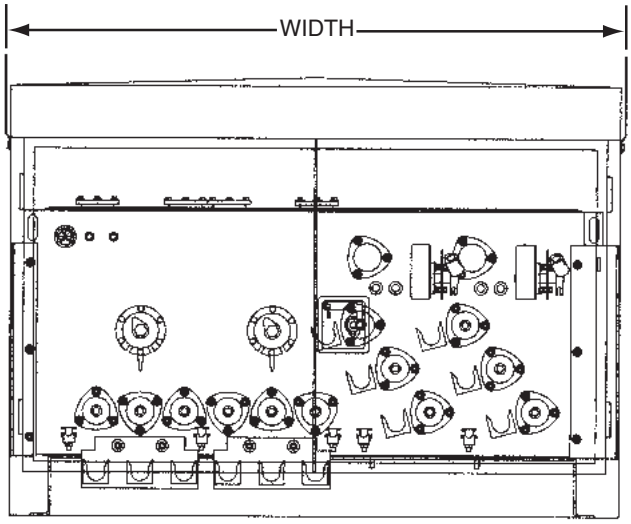
## THREE POSITION, FRONT ACCESS, TRIAD™ SERIES 1 WITH LOAD BREAK GROUND SWITCHES CONTINUED

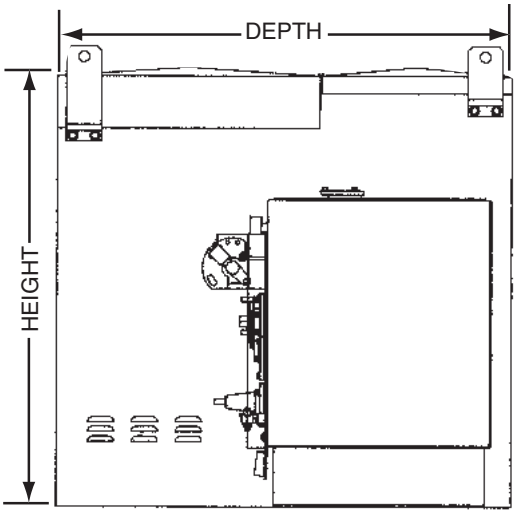
### TRIAD SERIES 1 - FRONT ACCESS

| Model | One-line Diagram | Voltage Class (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Depth in. (mm) | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|---|
| 6F |  | 15 | TVI32-376-12-6F | 67.9 (1725) | 55 (1397) | 1700 (773) |
| | | | TFI32-376-12-6F | 55.6 (1413) | 55 (1397) | 1350 (612) |
| | | 25 | TVI32-386-12-6F | 71 (1803) | 55 (1397) | 1550 (705) |
| | | | TFI32-386-12-6F | 55.6 (1413) | 55 (1397) | 1350 (612) |
| | | 35 | TVI32-396-12-6F | 80 (2032) | 55 (1397) | 1350 (612) |
| 9F |  | 15 | TVI42-376-12-9F | 92 (2337) | 55 (1397) | 2200 (1000) |
| | | | TFI42-376-12-9F | 68 (1727) | 55 (1397) | 2200 (1000) |
| | | 25 | TVI42-386-12-9F | 92 (2337) | 55 (1397) | 2200 (1000) |
| | | | TFI42-386-12-9F | 68 (1727) | 55 (1397) | 2200 (1000) |
| | | 35 | TVI42-396-12-9F | 112 (2845) | 55 (1397) | 2400 (1090) |
| 52F |  | 15 | TVI52-376-12-52F | 113 (2870) | 55 (1397) | 2450 (1112) |
| | | | TFI52-376-12-52F | 76.1 (1934) | 55 (1397) | 2800 (1273) |
| | | 25 | TVI52-386-12-52F | 113 (2870) | 55 (1397) | 2450 (1112) |
| | | | TFI52-386-12-52F | 76.1 (1934) | 55 (1397) | 2800 (1273) |
| | | 35 | TVI52-396-12-52F | 143 (3632) | 55 (1397) | 2850 (1294) |
| 62F |  | 15 | TVI62-376-12-62F | 134 (3404) | 55 (1397) | 2700 (1226) |
| | | | TFI62-376-12-62F | 95.2 (2417) | 55 (1397) | 3050 (1386) |
| | | 25 | TVI62-386-12-62F | 134 (3404) | 55 (1397) | 2700 (1226) |
| | | | TFI62-386-12-62F | 92 (2337) | 55 (1397) | 3050 (1386) |
| | | 35 | TVI62-396-12-62F | 173 (4394) | 55 (1397) | 3400 (1544) |

**Approximate height of enclosure = 50" (1270mm).*

**For typical specifications, go to www.gwelec.com.**
**For contact principle, see pages 32, 33 and 36.**



## THREE POSITION, FRONT / BACK, TRIAD™ SERIES 1 WITH LOAD BREAK GROUND SWITCHES

**CONTINUED**

Switches incorporate rotary puffer style internal ground for the load break switch ways. Provides front and back compartments for separating source and tap cables. Fault interrupters can be changed from single phase to three phase protection in the field.

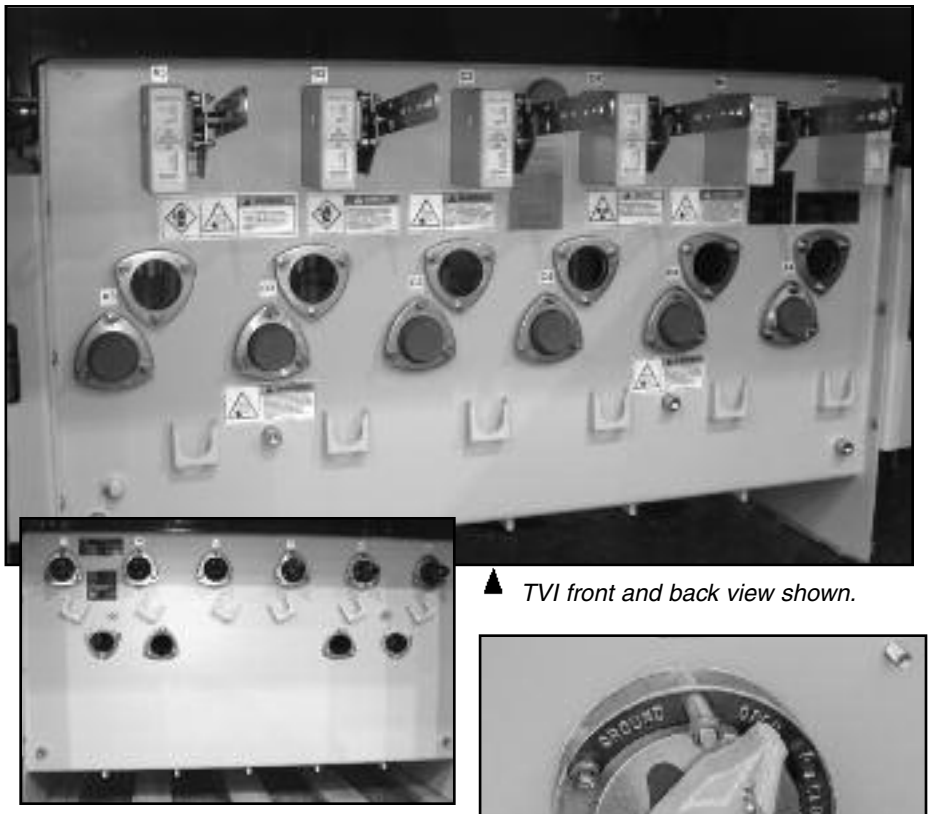
**Model TVI**
Provides single phase or three phase protection, with 12 or 20kA symmetrical interrupting.

**Load break switch (RP) ratings**

| | | | |
|---|---|---|---|
| Maximum design voltage, kV | 15.5 | 27 | 38 |
| Voltage class, kV | 15 | 25 | 35 |
| Impulse level (BIL), kV | 110 | 125 | 150 |
| One minute withstand, AC kV | 35 | 60 | 70 |
| One minute withstand, Production test rating AC kV | 34 | 40 | 50 |
| 15 minute withstand, DC kV | 53 | 78 | 103 |
| Continuous and load break current, Amps | 630 | 630 | 630 |
| Momentary current, kA asym | 40 | 40 | 40 |
| Fault-close current, (3 times) kA asym | 32 | 32 | 32 |
| One second current kA sym | 25 | 25 | 25 |
| Mechanical endurance, operations | 2000 | 2000 | 2000 |

**Fault interrupter (VI) ratings**

| | | | |
|---|---|---|---|
| Maximum design voltage, kV | 15.5 | 27 | 38 |
| Voltage class, kV | 15 | 25 | 35 |
| Impulse level (BIL), kV | 95 | 125 | 150 |
| One minute withstand, AC kV | 50 | 60 | 70 |



*TVI front and back view shown.*

| | | | |
|---|---|---|---|
| One minute withstand, Production test rating AC kV | 34 | 40 | 50 |
| 15 minute withstand, DC kV | 53 | 78 | 103 |
| Continuous and load break current, Amps | 630 | 630 | 630 |
| Symmetrical interrupting rating, kA** | 12 | 12 | 12 |

***20kA available*

**IEEE C37.60**
**Fault Interrupting Duty**
Total number of fault interruptions: 116

| Percent of Maximum Interrupting Rating | Approx. Interrupting Current, Amps | No. of Fault Interruptions |
|---|---|---|
| 15-20% | 2,000 | 44 |
| 45-55% | 6,000 | 56 |
| 90-100% | 12,000 | 16 |

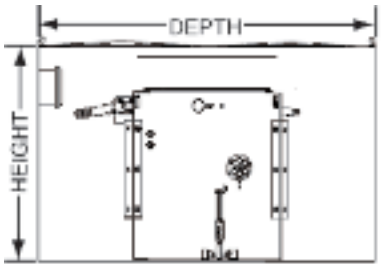

*Load break multi-position switch operator.*

*Single phase interrupter operating handles.*

*Three phase interrupter operating handle.*

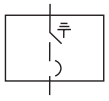
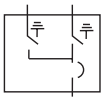
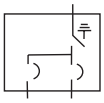
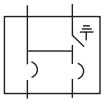
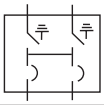
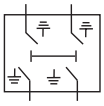
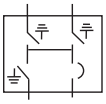
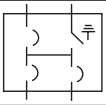
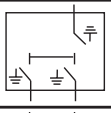
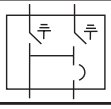
## THREE POSITION, FRONT / BACK, TRIAD™ SERIES 1 WITH LOAD BREAK GROUND SWITCHES CONTINUED

**For typical specifications, go to www.gwelec.com. For contact principle, see pages 33 and 36.**

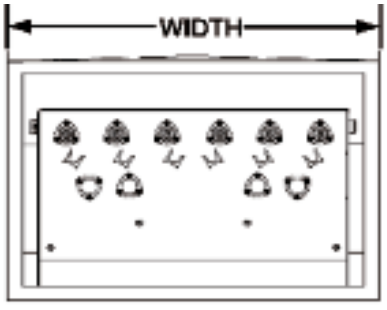



*Side view showing load break operator.*

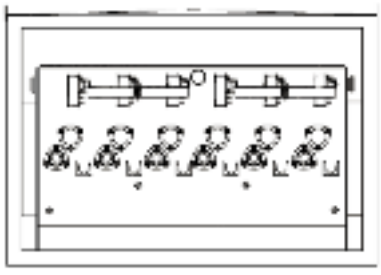
### TRIAD SERIES 1 – FRONT / BACK ACCESS

| Model | One-line Diagram | Voltage Class (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Depth in. (mm) | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|---|
| 5 |  | 15 | TVI21-376-12-5 | 44.5 (1130) | 79 (2007) | 850 (432) |
| | | 25 | TVI21-386-12-5 | 44.5 (1130) | 79 (2007) | 850 (432) |
| | | 35 | TVI21-396-12-5 | 44.5 (1130) | 79 (2007) | 850 (432) |
| 6 |  | 15 | TVI32-376-12-6 | 74 (1880) | 79 (2007) | 1700 (773) |
| | | 25 | TVI32-386-12-6 | 74 (1880) | 79 (2007) | 1700 (773) |
| | | 35 | TVI32-396-12-6 | 74 (1880) | 79 (2007) | 1700 (773) |
| 7 |  | 15 | TVI31-376-12-7 | 74 (1880) | 79 (2007) | 2000 (909) |
| | | 25 | TVI31-386-12-7 | 74 (1880) | 79 (2007) | 2000 (909) |
| | | 35 | TVI31-396-12-7 | 74 (1880) | 79 (2007) | 2000 (909) |
| 8 |  | 15 | TVI41-376-12-8 | 74 (1880) | 79 (2007) | 2300 (1045) |
| | | 25 | TVI41-386-12-8 | 74 (1880) | 79 (2007) | 2300 (1045) |
| | | 35 | TVI41-396-12-8 | 74 (1880) | 79 (2007) | 2300 (1045) |
| 9 |  | 15 | TVI42-376-12-9 | 74 (1880) | 79 (2007) | 2300 (1045) |
| | | 25 | TVI42-386-12-9 | 74 (1880) | 79 (2007) | 2300 (1045) |
| | | 35 | TVI42-396-12-9 | 74 (1880) | 79 (2007) | 2300 (1045) |
| 10 |  | 15 | T44-376-40-10 | 74 (1880) | 79 (2007) | 2200 (1000) |
| | | 25 | T44-386-40-10 | 74 (1880) | 79 (2007) | 2200 (1000) |
| | | 35 | T44-396-40-10 | 74 (1880) | 79 (2007) | 2200 (1000) |
| 11 |  | 15 | TVI43-376-12-11 | 74 (1880) | 79 (2007) | 2200 (1000) |
| | | 25 | TVI43-386-12-11 | 74 (1880) | 79 (2007) | 2200 (1000) |
| | | 35 | TVI43-396-12-11 | 74 (1880) | 79 (2007) | 2200 (1000) |
| 12 |  | 15 | TVI41-376-12-12 | 74 (1880) | 79 (2007) | 2400 (1091) |
| | | 25 | TVI41-386-12-12 | 74 (1880) | 79 (2007) | 2400 (1091) |
| | | 35 | TVI41-396-12-12 | 74 (1880) | 79 (2007) | 2400 (1091) |
| 13 |  | 15 | T33-376-40-13 | 74 (1880) | 79 (2007) | 2000 (908) |
| | | 25 | T33-386-40-13 | 74 (1880) | 79 (2007) | 2000 (908) |
| | | 35 | T33-396-40-13 | 74 (1880) | 79 (2007) | 2000 (908) |
| 14 |  | 15 | TVI42-376-12-14 | 74 (1880) | 79 (2007) | 2000 (908) |
| | | 25 | TVI42-386-12-14 | 74 (1880) | 79 (2007) | 2000 (908) |
| | | 35 | TVI42-396-12-14 | 74 (1880) | 79 (2007) | 2000 (908) |

**Approximate height of enclosure = 50" (1270mm).*




*Front view showing source cable entrances.*



*Back view showing VI cable entrances and operators.*

## THREE POSITION, FRONT / BACK ACCESS, TRIAD™ SERIES 2 WITH BOTH LOAD BREAK AND FAULT INTERRUPTER GROUND SWITCHES

**Model TNI**
Switches incorporate rotary puffer style internal ground switching for both the load break and fault interrupter switch ways. Model NI vacuum interrupter three phase mechanisms are used.

**Load break switch (RP) ratings**

| | | | |
|---|---|---|---|
| Maximum design voltage, kV | 15.5 | 27 | 38 |
| Voltage class, kV | 15 | 25 | 35 |
| Impulse level (BIL), kV | 110 | 125 | 150 |
| One minute withstand, AC kV | 35 | 60 | 70 |
| One minute withstand, Production test rating AC kV | 34 | 40 | 50 |
| 15 minute withstand, DC kV | 53 | 78 | 103 |
| Continuous and load break current, Amps | 630 | 630 | 630 |
| Momentary current, kA asym | 40 | 40 | 40 |
| Fault-close current, (3 times) kA asym | 32 | 32 | 32 |
| One second current kA sym | 25 | 25 | 25 |
| Mechanical endurance, operations | 2000 | 2000 | 2000 |

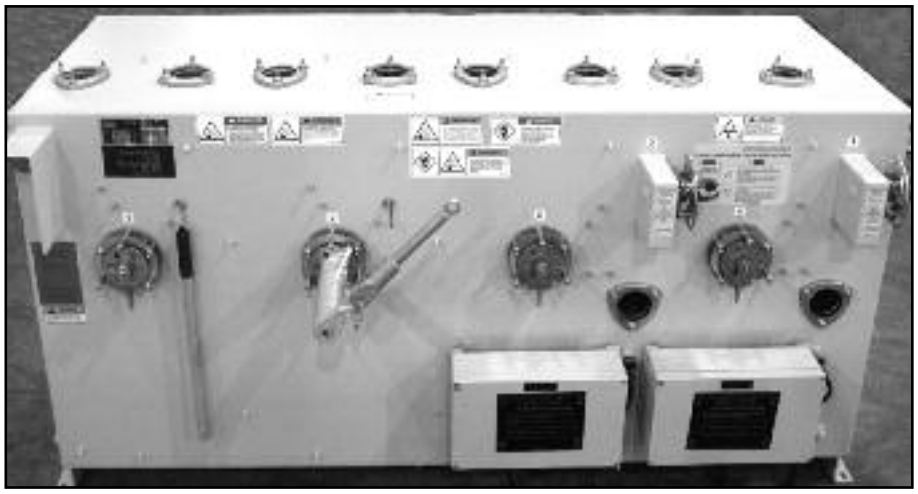
**Fault interrupter (NI) ratings**

| | | | |
|---|---|---|---|
| Maximum design voltage, kV | 15.5 | 27 | 38 |
| Voltage class, kV | 15 | 25 | 35 |
| Impulse level (BIL), kV | 110 | 125 | 150 |
| One minute withstand, AC kV | 50 | 60 | 70 |
| One minute withstand, Production test rating AC kV | 34 | 40 | 50 |
| 15 minute withstand, DC kV | 53 | 78 | 103 |
| Continuous and load break current, Amps | 630 | 630 | 630 |
| Symmetrical interrupting rating, kA** | 12.5 | 12.5 | 12.5 |

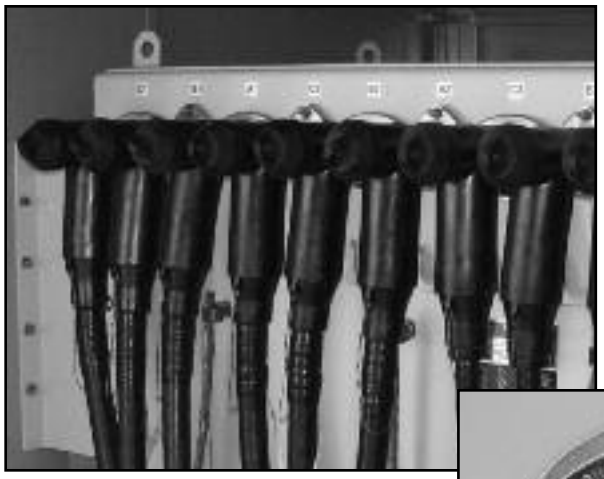
***20kA and 25kA available*

**IEEE C37.60**
**Fault Interrupting Duty**
Total number of fault interruptions: 116

| 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 |



*Front view of a TNI-9L shown. Contact viewing windows are on the top of the switch. See viewing window option below.*



*Cable entrances are located on the back of the switch.*

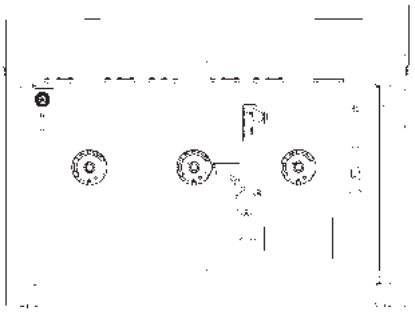
*Load break multi-position switch operator.*

*Optional large viewing window for load break switch visible break.*

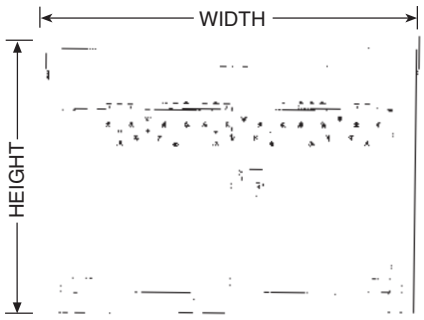
## THREE POSITION, FRONT / BACK ACCESS, TRIAD™ SERIES 2 WITH BOTH LOAD BREAK AND FAULT INTERRUPTER GROUND SWITCHES

**CONTINUED**

Front/back access design with all operating mechanisms in the front and all cable entrances in the back compartment. Contact viewing windows are located on the top of the switch tank.



*Front view showing load break and vacuum interrupter operators.*




*Rear view showing all cable entrances.*

**For typical specifications, go to www.gwelec.com. For contact principle, see pages 32 and 36.**

| Model | One-line Diagram | Voltage Class (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
| 5 | | 15 | TNI21-376-12-5L | 51 (1295) | 1725 (782) |
| | | 25 | TNI21-386-12-5L | 51 (1295) | 1725 (782) |
| | | 35 | TNI21-396-12-5L | 51 (1295) | 1725 (782) |
| 6 | | 15 | TNI32-376-12-6L | 69 (1753) | 2900 (1315) |
| | | 25 | TNI32-386-12-6L | 69 (1753) | 2900 (1315) |
| | | 35 | TNI32-396-12-6L | 69 (1753) | 2900 (1315) |
| 7 | | 15 | TNI31-376-12-7L | 69 (1753) | 2670 (1211) |
| | | 25 | TNI31-386-12-7L | 69 (1753) | 2670 (1211) |
| | | 35 | TNI31-396-12-7L | 69 (1753) | 2670 (1211) |
| 9 | | 15 | TNI42-376-12-9L | 88 (2235) | 3170 (1437) |
| | | 25 | TNI42-386-12-9L | 88 (2235) | 3170 (1437) |
| | | 35 | TNI42-396-12-9L | 88 (2235) | 3170 (1437) |
| 11 | | 15 | TNI43-376-12-11L | 88 (2235) | 3095 (1403) |
| | | 25 | TNI43-386-12-11L | 88 (2235) | 3095 (1403) |
| | | 35 | TNI43-396-12-11L | 88 (2235) | 3095 (1403) |
| 12 | | 15 | TNI41-376-12-12L | 88 (2235) | 3245 (1471) |
| | | 25 | TNI41-386-12-12L | 88 (2235) | 3245 (1471) |
| | | 35 | TNI41-396-12-12L | 88 (2235) | 3245 (1471) |
| 51 | | 15 | TNI51-376-12-51L | 106 (2692) | 3840 (1741) |
| | | 25 | TNI51-386-12-51L | 106 (2692) | 3840 (1741) |
| | | 35 | TNI51-396-12-51L | 106 (2692) | 3840 (1741) |
| 52 | | 15 | TNI52-376-12-52L | 106 (1753) | 3735 (1698) |
| | | 25 | TNI52-386-12-52L | 106 (1753) | 3735 (1698) |
| | | 35 | TNI52-396-12-52L | 106 (1753) | 3735 (1698) |
| 53 | | 15 | TNI53-376-12-53L | 106 (1753) | 3690 (3200) |
| | | 25 | TNI53-386-12-53L | 106 (1753) | 3690 (3200) |
| | | 35 | TNI53-396-12-53L | 106 (1753) | 3690 (3200) |
| 54 | | 15 | TNI54-376-12-54L | 106 (1753) | 3690 (3200) |
| | | 25 | TNI54-386-12-54L | 106 (1753) | 3690 (3200) |
| | | 35 | TNI54-396-12-54L | 106 (1753) | 3690 (3200) |
| 62 | | 15 | TNI62-376-12-62L | 124 (3150) | 4340 (1969) |
| | | 25 | TNI62-386-12-62L | 124 (3150) | 4340 (1969) |
| | | 35 | TNI62-396-12-62L | 124 (3150) | 4340 (1969) |
| 63 | | 15 | TNI63-376-12-63L | 124 (3150) | 4265 (1935) |
| | | 25 | TNI63-386-12-63L | 124 (3150) | 4265 (1935) |
| | | 35 | TNI63-396-12-63L | 124 (3150) | 4265 (1935) |
| 64 | | 15 | TNI64-376-12-64L | 124 (3150) | 4275 (1939) |
| | | 25 | TNI64-386-12-64L | 124 (3150) | 4275 (1939) |
| | | 35 | TNI64-396-12-64L | 124 (3150) | 4275 (1939) |
| 65 | | 15 | TNI65-376-12-65L | 124 (3150) | 4275 (1939) |
| | | 25 | TNI65-386-12-65L | 124 (3150) | 4275 (1939) |
| | | 35 | TNI65-396-12-65L | 124 (3150) | 4275 (1939) |

**All voltage classes have a height = 53" (1346mm); and depth = 73" (1854mm).*

## THREE POSITION, VANTAGE® SERIES WITH BOTH LOAD BREAK AND FAULT INTERRUPTER GROUND SWITCHES

The Vantage provides visible break on both load break and fault interrupting ways. The switch can be ordered with 12.5kA or 25kA symmetrical interrupting. Open/close switching with integral ground position simplifies system grounding procedures. Large viewing windows help verify switch contact position for operating personnel.

Tested to IEEE C37.74 and C37.60 standards. Switches comply to arc resistance requirements of 25kA for 15 cycles per IEC 62271-201, Annex A.


▲ *Model DSTI-6L less enclosure shown.*

**Load break switch ratings**

Maximum design voltage,
kV .....15.5 .....27 .....38
Impulse level (BIL),
kV .....110 .....125.....150
Continuous and load break current,
Amps** .....630 .....630.....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.....40 .....40
Fault-close current, (3 times)
kA asym .....40.....40 .....40
One second current,
kA sym .....25.....25 .....25
Mechanical endurance,
operations....2000....2000 ..2000

**Fault interrupter rating**

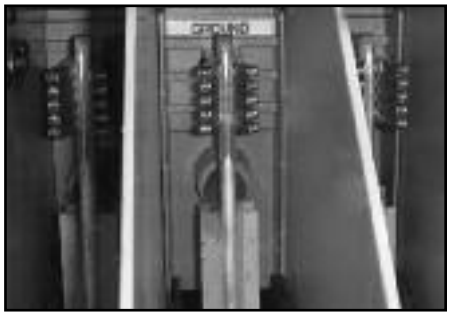
Maximum design voltage,
kV .....15.5 .....27 .....38
Impulse level (BIL),
kV .....110 .....125.....150
Continuous and load break current,
Amps** .....630 .....630.....630
One minute withstand, (dry)
AC kV .....50.....60 .....70
One minute withstand, (dry)
Production test rating
AC kV .....34.....40 .....50
Symmetrical interrupting rating,
kA* .....25.....25 .....25
Asym. interrupting rating,
kA asym .....40.....40 .....40

**12.5 kA design available*
***800A available*

**IEEE C37.60 FAULT INTERRUPTING DUTY**

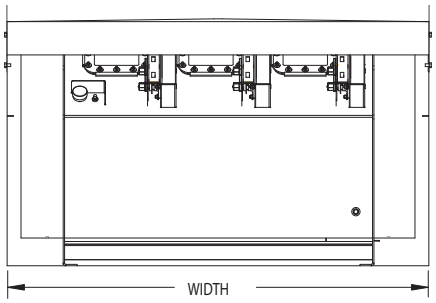
Total number of fault interruptions: 116

| 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 |

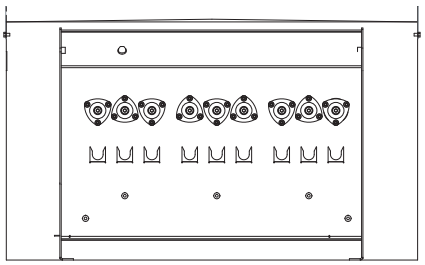


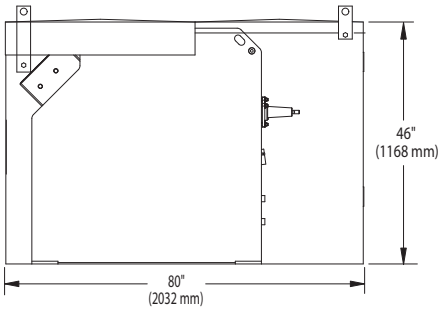
*Photos right: Closed, open and ground contacts as seen through the viewing window.* ►

## THREE POSITION, VANTAGE® SERIES WITH BOTH LOAD BREAK AND FAULT INTERRUPTER GROUND SWITCHES CONTINUED



FRONT VIEW


BACK VIEW



SIDE VIEW

**For typical specifications, go to www.gwelec.com.**

**Approximate dimensions, height = 46" (1168mm); depth = 80" (2032mm).*

| Model | One-line Diagram | Voltage Class (kV) | Catalog Number | Approximate Width in. (mm)* | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
| 5 | | 15 | DST21-376-25-5L | 45 (1143) | 2400 (1089) |
| | | 25 | DST21-386-25-5L | 45 (1143) | 2400 (1089) |
| | | 35 | DST21-396-25-5L | 45 (1143) | 2400 (1089) |
| 6 | | 15 | DST32-376-25-6L | 62 (1575) | 2800 (1270) |
| | | 25 | DST32-386-25-6L | 62 (1575) | 2800 (1270) |
| | | 35 | DST32-396-25-6L | 62 (1575) | 2800 (1270) |
| 7 | | 15 | DST31-376-25-7L | 62 (1575) | 2800 (1270) |
| | | 25 | DST31-386-25-7L | 62 (1575) | 2800 (1270) |
| | | 35 | DST31-396-25-7L | 62 (1575) | 2800 (1270) |
| 9 | | 15 | DST42-376-25-9L | 79 (2007) | 3200 (1452) |
| | | 25 | DST42-386-25-9L | 79 (2007) | 3200 (1452) |
| | | 35 | DST42-396-25-9L | 79 (2007) | 3200 (1452) |
| 11 | | 15 | DST43-376-25-11L | 79 (2007) | 3200 (1452) |
| | | 25 | DST43-386-25-11L | 79 (2007) | 3200 (1452) |
| | | 35 | DST43-396-25-11L | 79 (2007) | 3200 (1452) |
| 12 | | 15 | DST41-376-25-12L | 79 (2007) | 3200 (1452) |
| | | 25 | DST41-386-25-12L | 79 (2007) | 3200 (1452) |
| | | 35 | DST41-396-25-12L | 79 (2007) | 3200 (1452) |
| 51 | | 15 | DST51-376-25-51L | 96 (2438) | 3600 (1633) |
| | | 25 | DST51-386-25-51L | 96 (2438) | 3600 (1633) |
| | | 35 | DST51-396-25-51L | 96 (2438) | 3600 (1633) |
| 52 | | 15 | DST52-376-25-52L | 96 (2438) | 3600 (1633) |
| | | 25 | DST52-386-25-52L | 96 (2438) | 3600 (1633) |
| | | 35 | DST52-396-25-52L | 96 (2438) | 3600 (1633) |
| 53 | | 15 | DST53-376-25-53L | 96 (2438) | 3600 (1633) |
| | | 25 | DST53-386-25-53L | 96 (2438) | 3600 (1633) |
| | | 35 | DST53-396-25-53L | 96 (2438) | 3600 (1633) |
| 54 | | 15 | DST54-376-25-54L | 96 (2438) | 3600 (1633) |
| | | 25 | DST54-386-25-54L | 96 (2438) | 3600 (1633) |
| | | 35 | DST54-396-25-54L | 96 (2438) | 3600 (1633) |
| 62 | | 15 | DST62-376-25-62L | 113 (2870) | 4000 (1814) |
| | | 25 | DST62-386-25-62L | 113 (2870) | 4000 (1814) |
| | | 35 | DST62-396-25-62L | 113 (2870) | 4000 (1814) |
| 63 | | 15 | DST63-376-25-63L | 113 (2870) | 4000 (1814) |
| | | 25 | DST63-386-25-63L | 113 (2870) | 4000 (1814) |
| | | 35 | DST63-396-25-63L | 113 (2870) | 4000 (1814) |
| 64 | | 15 | DST64-376-25-64L | 113 (2870) | 4000 (1814) |
| | | 25 | DST64-386-25-64L | 113 (2870) | 4000 (1814) |
| | | 35 | DST64-396-25-64L | 113 (2870) | 4000 (1814) |
| 65 | | 15 | DST65-376-25-65L | 113 (2870) | 4000 (1814) |
| | | 25 | DST65-386-25-65L | 113 (2870) | 4000 (1814) |
| | | 35 | DST65-396-25-65L | 113 (2870) | 4000 (1814) |

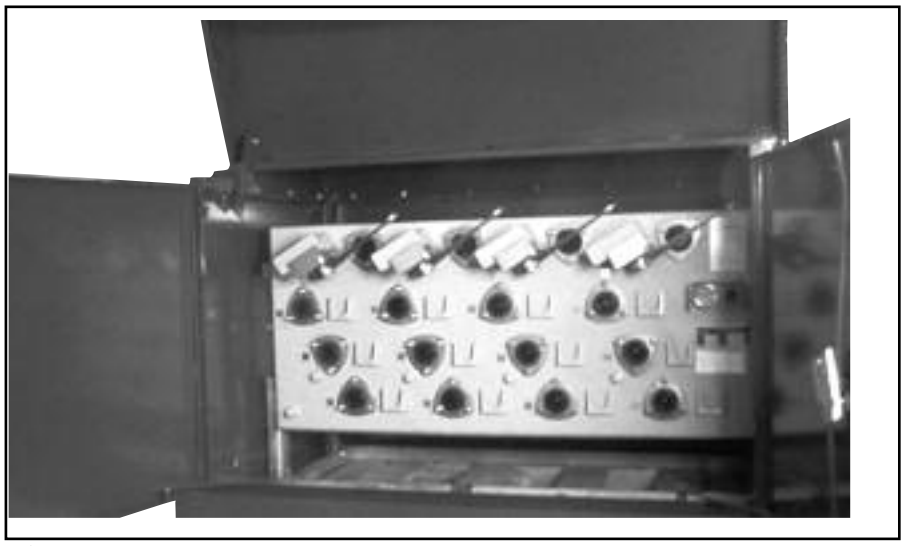
***For 12.5kA fault interrupting design, replace catalog digits -25 with -12. Switch dimensions are the same.*

## TWO POSITION LOAD BREAK, FRONT ACCESS, SPRAM-F / PRAM-F

Available in rotary puffer (RP) and linear puffer (PI) designs.

**SPRAM-F** styles provide the most compact construction due to diagonal bushing arrangements with a 6-1/2" phase spacing. These models can accommodate bushing mounted fuses.

**PRAM-F** styles incorporate in-line bushing arrangements with a 5" phase spacing. Bushings can be top, bottom, front or side mounted.



*Front access SPRAM44-F shown.*

*Front access PRAM33-F shown.*

**Rotary Puffer (RP) ratings**

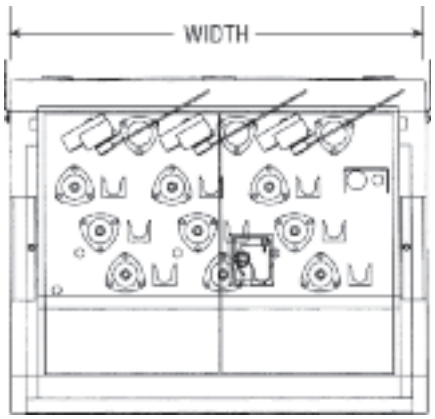
| | | | |
|---|---|---|---|
| Maximum design voltage, kV | 15.5 | | 27 |
| Voltage class, kV | 15 | | 25 |
| Impulse level (BIL) kV | 110 | | 125 |
| One minute withstand, AC kV | 35 | | 60 |
| One minute withstand, Production test rating AC kV | 34 | | 40 |
| 15 minute withstand, DC kV | 53 | | 78 |
| Continuous and load break current, Amps | 630 | | 630 |
| Momentary current, kA asym | 25.6 | | 20 |
| Fault-close current, (3 times) kA asym | 25.6 | | 20 |
| One second current, kA sym | 16 | | 12.5 |
| Operations load interrupting endurance (15kV) at 600A | 500 | | 350 |
| Mechanical endurance, operations | 2000 | | 2000 |

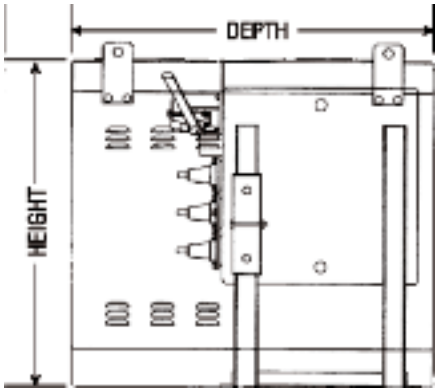
**Linear Puffer (PI) ratings**

| | | | |
|---|---|---|---|
| Maximum design voltage, kV | 15.5 | 27 | 38 |
| Voltage class, kV | 15 | 25 | 35 |
| Impulse level (BIL), kV | 110 | 125 | 150 |
| One minute withstand, AC kV | 35 | 60 | 70 |
| One minute withstand, Production test rating AC kV | 34 | 40 | 50 |
| 15 minute withstand, DC kV | 53 | 78 | 103 |
| Continuous and load break current, Amps* | 630 | 630 | 630 |
| Momentary current, kA asym | 40 | 40 | 40 |
| Fault-close current, (3 times) kA asym | 40 | 40 | 40 |
| One second current, kA sym | 25 | 25 | 25 |
| Open gap withstand, kV | 200 | 200 | 200 |
| 10 operation overload interrupting capability, Amps | 3000 | 3000 | 3000 |
| Operations load interrupting at 600A | 1200 | 1200 | 1200 |
| Mechanical endurance, operations | 2000 | 2000 | 2000 |

**900A available*

## Two Position Load Break, Front Access, SPRAM-F / PRAM-F



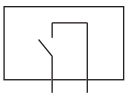
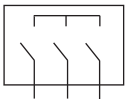
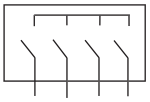
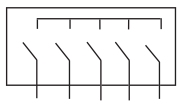
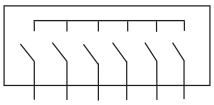
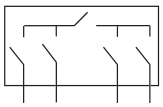




**SPRAM catalog numbers shown. For PRAM catalog numbers, remove prefix "S".*

***For RP designs: Enclosure depth = 48.6" (1234mm), height = 58.7" (1491mm) based on SPRAM style. For PRAM style add up to 8" (207mm) to width dimensions. Depth and height are the same as SPRAM style.*

*For PI designs: Enclosure depth = 55" (1397mm), height = 46" (1168mm) based on SPRAM style. For PRAM style add 2.5" (63mm) per way to width dimensions. Depth and height are the same as SPRAM style.*

## SPRAM-F Two Position Load Break, Front Access

| One-line Diagram (Horizontal) | Voltage Class (kV) | Mom. (kA) asym. | Catalog Number* | Approximate Width in. (mm)** | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
|  | 15 | 25 | SPRAM21-376F-25RP | 38.1 (969) | 1100 (499) |
| | | 40 | SPRAM21-376F-40PI | 41.1 (1045) | 1350 (614) |
| | 25 | 20 | SPRAM21-386F-20RP | 38.1 (969) | 1100 (499) |
| | | 40 | SPRAM21-386F-40PI | 41.1 (1045) | 1350 (614) |
| | 35 | 40 | SPRAM21-396F-40PI | 41.1 (1045) | 1350 (614) |
|  | 15 | 25 | SPRAM33-376F-25RP | 50.1 (1274) | 1400 (636) |
| | | 40 | SPRAM33-376F-40PI | 53.8 (1365) | 1700 (773) |
| | 25 | 20 | SPRAM33-386F-20RP | 50.1 (1274) | 1400 (636) |
| | | 40 | SPRAM33-386F-40PI | 53.8 (1365) | 1700 (773) |
| | 35 | 40 | SPRAM33-396F-40PI | 53.8 (1365) | 1700 (773) |
|  | 15 | 25 | SPRAM44-376F-25RP | 62.1 (1578) | 1700 (772) |
| | | 40 | SPRAM44-376F-40PI | 66.1 (1680) | 2000 (909) |
| | 25 | 20 | SPRAM44-386F-20RP | 62.1 (1578) | 1700 (772) |
| | | 40 | SPRAM44-386F-40PI | 66.1 (1680) | 2000 (909) |
| | 35 | 40 | SPRAM44-396F-40PI | 66.1 (1680) | 2000 (909) |
|  | 15 | 25 | SPRAM55-376F-25RP | 74.1 (1883) | 2000 (908) |
| | | 40 | SPRAM55-376F-40PI | 78.6 (1997) | 2500 (1136) |
| | 25 | 20 | SPRAM55-386F-20RP | 74.1 (1883) | 2000 (908) |
| | | 40 | SPRAM55-386F-40PI | 78.6 (1997) | 2500 (1136) |
| | 35 | 40 | SPRAM55-396F-40PI | 78.6 (1997) | 2500 (1136) |
|  | 15 | 25 | SPRAM66-376F-25RP | 86.1 (2187) | 2200 (999) |
| | | 40 | SPRAM66-376F-40PI | 91 (2311) | 2600 (1182) |
| | 25 | 20 | SPRAM66-386F-20RP | 86.1 (2187) | 2200 (999) |
| | | 40 | SPRAM66-386F-40PI | 91 (2311) | 2600 (1182) |
| | 35 | 40 | SPRAM66-396F-40PI | 91 (2311) | 2600 (1182) |
|  ***Bus Tie*** | 15 | 25 | SPRAM45-376F-25RP | 74.2 (1885) | 2250 (1023) |
| | | 40 | SPRAM45-376F-40PI | 78.5 (1991) | 2000 (909) |
| | 25 | 20 | SPRAM45-386F-20RP | 74.2 (1885) | 2250 (1023) |
| | | 40 | SPRAM45-386F-40PI | 78.5 (1991) | 2000 (909) |
| | 35 | 40 | SPRAM45-396F-40PI | 78.5 (1991) | 2000 (909) |

**For typical specifications, go to www.gwelec.com.**
**For contact principle, see pages 34 and 35.**

## TWO POSITION LOAD BREAK, FRONT / BACK ACCESS PRAM-L STYLE

Front / back access designs incorporate all operating mechanisms in one compartment and in-line cable entrance bushings in a separate compartment.

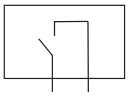
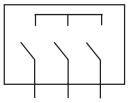
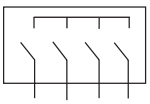
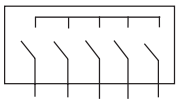
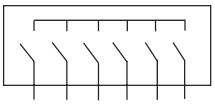
**Linear Puffer (PI) ratings**

Maximum design voltage,
kV .....15.5 .....27 .....38
Voltage class,
kV .....15.....25 .....35
Impulse level (BIL),
kV .....110 .....125 ....150
One minute withstand,
AC kV .....35.....60 .....70
One minute withstand,
Production test rating
AC kV .....34.....40 .....50
15 minute withstand,
DC kV .....53.....78 .....103
Continuous and load break current,
Amps* .....630 .....630 ....630
Momentary current,
kA asym .....40.....40 .....40
Fault-close current, (3 times)
kA asym .....40.....40 .....40
One second current,
kA sym .....25.....25 .....25
Open gap withstand,
kV .....200 .....200 ....200
10 operation overload interrupting capability,
Amps.....3000....3000 ..3000
Operations load interrupting at 600A .....1200....1200 ..1200
Mechanical endurance,
operations .....2000....2000 ..2000

**900A available*

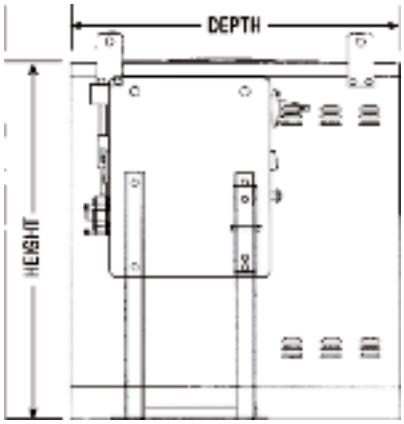
FRONT VIEW

## PRAM-L TWO POSITION LOAD BREAK, FRONT / BACK ACCESS

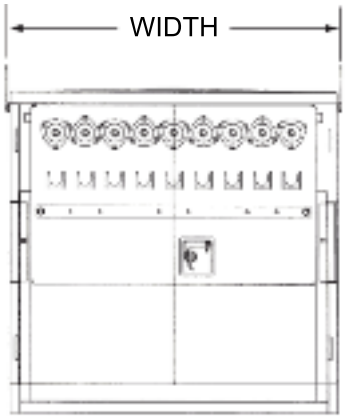
| One-line Diagram (Horizontal) | Voltage Class (kV) | Mom. (kA) asym. | Catalog Number | Approximate Width in. (mm)* | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
|  | 15 | 40 | PRAM21-376L-40PI | 41 (1041) | 1550 (705) |
| | 25 | 40 | PRAM21-386L-40PI | 41 (1041) | 1550 (705) |
| | 35 | 40 | PRAM21-396L-40PI | 41 (1041) | 1550 (705) |
|  | 15 | 40 | PRAM33-376L-40PI | 55 (1397) | 1682 (763) |
| | 25 | 40 | PRAM33-386L-40PI | 55 (1397) | 1682 (763) |
| | 35 | 40 | PRAM33-396L-40PI | 55 (1397) | 1682 (763) |
|  | 15 | 40 | PRAM44-376L-40PI | 70 (1778) | 1800 (818) |
| | 25 | 40 | PRAM44-386L-40PI | 70 (1778) | 1800 (818) |
| | 35 | 40 | PRAM44-396L-40PI | 70 (1778) | 1800 (818) |
|  | 15 | 40 | PRAM55-376L-40PI | 86 (2184) | 2400 (1089) |
| | 25 | 40 | PRAM55-386L-40PI | 86 (2184) | 2400 (1089) |
| | 35 | 40 | PRAM55-396L-40PI | 86 (2184) | 2400 (1089) |
|  | 15 | 40 | PRAM66-376L-40PI | 101 (2565) | 2600 (1182) |
| | 25 | 40 | PRAM66-386L-40PI | 101 (2565) | 2600 (1182) |
| | 35 | 40 | PRAM66-396L-40PI | 101 (2565) | 2600 (1182) |

**At 15kV: Enclosure depth = 50.8" (1289mm), height = 55" (1397mm).*
*At 25 & 35kV: Enclosure depth = 57.8" (1468mm), height = same.*

**For typical specifications, go to www.gwelec.com.**
**For contact principle, see page 35.**




SIDE VIEW




BACK VIEW

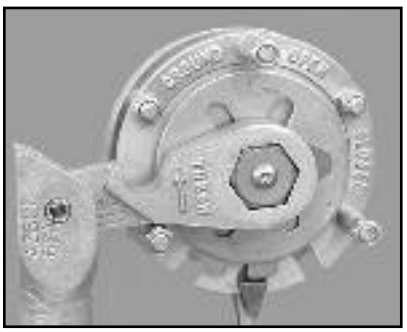
## THREE POSITION LOAD BREAK, FRONT ACCESS, T-RP STYLE

**(Close-Open-Ground)**

An integral ground position within the switch tank permits safe and easy grounding of the cable circuit without having to disconnect elbow or other cable entrance connections. Switching to ground is accomplished through the simple throw of the operating handle without having to de-energize other circuits through the switch. This feature is beneficial for applications where cable movement needs to be minimized. Ground stops with padlocking provisions help assure proper operation to the desired position.

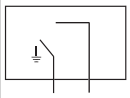
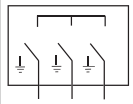
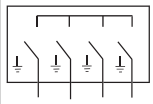
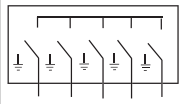
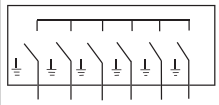
**Rotary Puffer (RP) Ratings**

Maximum design voltage,
kV .....15.5.....27 .....38
Voltage class,
kV .....15 .....25 .....35
Impulse level (BIL),
kV .....110.....125.....150
One minute withstand,
AC kV .....35 .....60 .....70
One minute withstand,
Production test rating
AC kV .....34 .....40 .....50
15 minute withstand,
DC kV .....53 .....78 .....103
Continuous and load break current,
Amps.....630.....630.....630
Momentary current,
kA asym .....40 .....40 .....40
Fault-close current, (3 times)
kA asym .....32 .....32 .....32
One second current
kA sym .....25 .....25 .....25
Mechanical endurance,
operations .....2000 ....2000 ..2000



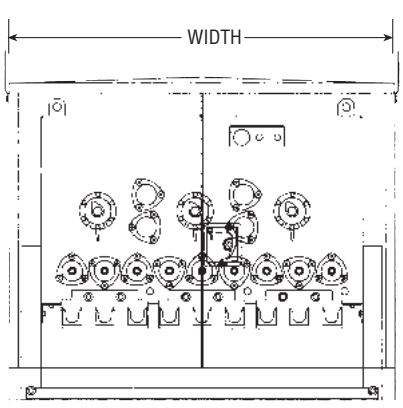

◄ *Multi-position operator and removable handle.*

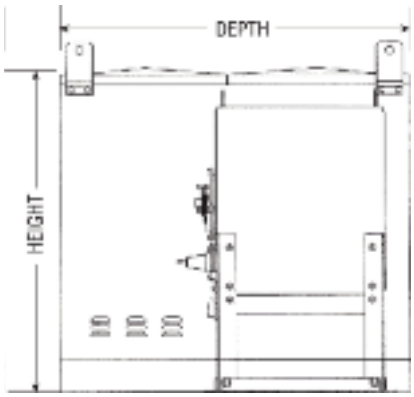
## T-RP STYLE (GROUND SWITCHES)

| One-line Diagram (Horizontal) | Voltage Class (kV) | Mom. (kA) asym. | Catalog Number | Approximate Width in. (mm)* | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
|  | 15 | 40 | T21-376F-40RP | 45 (1143) | 1400 (636) |
| | 25 | 40 | T21-386F-40RP | 45 (1143) | 1400 (636) |
| | 35 | 40 | T21-396F-40RP | 45 (1143) | 1400 (636) |
|  | 15 | 40 | T33-376F-40RP | 60 (1524) | 1600 (714) |
| | 25 | 40 | T33-386F-40RP | 60 (1524) | 1600 (714) |
| | 35 | 40 | T33-396F-40RP | 60 (1524) | 1600 (714) |
|  | 15 | 40 | T44-376F-40RP | 75 (1905) | 2100 (953) |
| | 25 | 40 | T44-386F-40RP | 75 (1905) | 2100 (953) |
| | 35 | 40 | T44-396F-40RP | 75 (1905) | 2100 (953) |
|  | 15 | 40 | T55-376F-40RP | 90 (2286) | 2300 (1044) |
| | 25 | 40 | T55-386F-40RP | 90 (2286) | 2300 (1044) |
| | 35 | 40 | T55-396F-40RP | 90 (2286) | 2300 (1044) |
|  | 15 | 40 | T66-376F-40RP | 105 (2667) | 2750 (1250) |
| | 25 | 40 | T66-386F-40RP | 105 (2667) | 2750 (1250) |
| | 35 | 40 | T66-396F-40RP | 105 (2667) | 2750 (1250) |

**Enclosure depth = 51" (1448mm), height = 49" (1245mm).*

**For typical specifications, go to www.gwelec.com.**
**For contact principle, see page 36.**



## VACUUM INTERRUPTERS

G&W Vacuum Interrupters combine the total cost and operating benefits of fuseless, electronically controlled, resettable overcurrent protection with the safety and maintenance benefits of a totally sealed, dead-front $SF_6$ insulated device. The switches are designed for automatic single or three phase fault interruption with manual load break capabilities for systems through 38kV, 630A continuous.

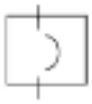
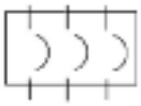
**FI Mechanism**

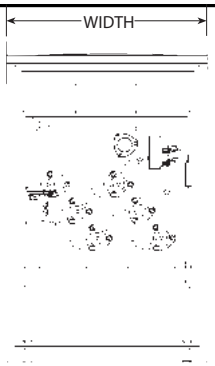
Maximum design voltage,
kV .....15.5 .....27
Voltage class,
kV .....15.....25
Impulse level (BIL),
kV .....110.....125
One minute withstand,
AC kV .....50.....60
One minute withstand,
Production test rating
AC kV .....34.....40
15 minute withstand,
DC kV .....53.....78
Continuous and load break current,
Amps .....630.....630
Symmetrical interrupting rating,
kA .....12.5.....12.5

**VI Mechanism**

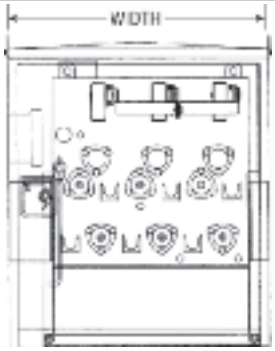
Maximum design voltage,
kV .....15.5 ..27.....38
Voltage class,
kV .....15 .....25.....35
Impulse level (BIL),
kV .....95 ....125 ..150
One minute withstand,
AC kV .....50 .....60.....70
One minute withstand,
Production test rating
AC kV .....34 .....40 .... 50
15 minute withstand,
DC kV .....53 .....78....103
Continuous and load break current,
Amps.....630 ..630 ..630
Symmetrical interrupting rating,
kA*.....12 .....12.....12

**20kA available*

| Phases | Three-line Diagram | Voltage Class (kV) | Amp | Catalog Number* | Approximate Width in. (mm)† | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|---|
| **VACUUM INTERRUPTER SWITCHES** | | | | | | |
| 1 |  | 15 | 630 | PVI20-176-12-4F | 24.5 (622) | 575 (261) |
| | | 25 | 630 | PVI20-186-12-4F | 24.5 (622) | 575 (261) |
| | | 35 | 630 | PVI20-196-12-4F | 24.5 (622) | 575 (261) |
| 3 |  | 15 | 630 | PNI20-376-25-4F | 45.1 (1146) | 1051 (476) |
| | | | 630 | PFI20-376-12-4F | 38.2 (970) | 1200 (545) |
| | | | 630 | PVI20-376-12-4F | 45.8 (1163) | 1000 (455) |
| | | 25 | 630 | PNI20-386-25-4F | 45.1 (1146) | 1051 (476) |
| | | | 630 | PFI20-386-12-4F | 38.2 (970) | 1200 (545) |
| | | | 630 | PVI20-386-12-4F | 45.8 (1163) | 1000 (455) |
| | | 35 | 630 | PNI20-396-12-4F | 45.1 (1146) | 1051 (476) |
| | | | 630 | PVI20-396-12-4F | 52 (1321) | 1150 (523) |




*Three phase model PFI with FI mechanism.*




*Three phase model PVI with VI mechanism.*

**NI Mechanism**

Maximum design voltage,
kV .....15.5.....27 .....38
Voltage class,
kV .....15 .....25 .....35
Impulse level (BIL),
kV .....110.....125 ....150
One minute withstand,
AC kV .....50 .....60 .....70
One minute withstand,
Production test rating
AC kV .....34 .....40 .....50
15 minute withstand,
DC kV .....53 .....78 .....103
Continuous and load break current,
Amps.....630.....630 ....630
Symmetrical interrupting rating,
kA .....25 .....25 ..12.5**

***25kA available*

**For 200A models, replace the "6" with 2", i.e. PVI20-172-12-4F.*

*†For Model PVI (single phase):*
*At 15-35kV: Enclosure height = 38" (965mm), depth = 36" (914mm).*

*For Model PVI (three phase):*
*At 15kV: Enclosure height = 49" (1245mm), depth = 38" (965mm).*
*At 25/35kV: Enclosure height = 61" (1549mm), depth = 45" (1143mm).*

*For Model PFI (three phase):*
*At 15-25kV: Enclosure height = 59" (1499mm), depth = 49" (1245mm).*

**For typical specifications, go to www.gwelec.com. For contact principle, see pages 32 and 33.**

## TWO POSITION, FRONT ACCESS FUSED FPRAM-F STYLE

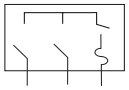
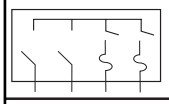
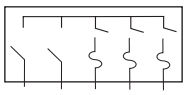
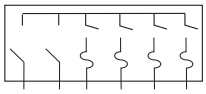
*Canister fuses incorporate a provision for hookstick removal and replacement.*

G&W's fused FPRAM-F style switches combine linear puffer (LP) contacts for source switches with rotary puffer (RP) contacts for fused ways. Bushings can be front or bottom mounted. For applications requiring current limitation and over-current interruption through 50kA symmetrical, air canister style current limiting fusing is available.

## CANISTER FUSES

For new orders, integral air insulated, canister style current limiting fusing is available for systems through 23kV. Canister style fused switches feature compact, dead-front construction with mechanical or key interlocking arrangements preventing access to the fuses unless the switch is in the open position. Safe, quick fuse replacement is accomplished using conventional tools and without exposing switch dielectric or current carrying parts to environmental contamination. Two fuses can be connected in parallel to double the capacity rating of the switch. The general purpose fuses are IEEE C37.473.C rated and can interrupt both high and low level fault currents while limiting the available fault current on the system.

## FUSED FPRAM-F SWITCHES

| One-line Diagram | Voltage Class (kV) | Catalog Number | Amp Max.* | Approximate Width ** in (mm) | Approximate Wt. w/$SF_6$ lbs (kg) |
|---|---|---|---|---|---|
|  | 15 | FPRAM21-376F-40PI | 40 | 47 (1194) | 750 (341) |
| | 23 | FPRAM21-386F-40PI | 40 | 47 (1194) | 750 (341) |
|  | 15 | FPRAM33-376F-40PI | 40 | 62 (1575) | 1060 (482) |
| | 23 | FPRAM33-386F-40PI | 40 | 62 (1575) | 1060 (482) |
|  | 15 | 2FPRAM44-376F-40PI | 40 | 87 (2210) | 1375 (625) |
| | 23 | 2FPRAM44-386F-40PI | 40 | 87 (2210) | 1375 (625) |
|  | 15 | 3FPRAM55-376F-40PI | 40 | 112 (2845) | 1690 (768) |
| | 23 | 3FPRAM55-386F-40PI | 40 | 112 (2845) | 1690 (768) |
|  | 15 | 4FPRAM66-376F-40PI | 40 | 137 (3480) | 2005 (911) |
| | 23 | 4FPRAM66-386F-40PI | 40 | 137 (3480) | 2005 (911) |

### RATINGS

Maximum design voltage,
kV .....15.5 .....27
Voltage class,
kV .....15.....25
Impulse level (BIL)
kV .....110.....125
One minute withstand,
AC kV .....35.....60
One minute withstand,
Production test rating
AC kV .....34.....40
15 minute withstand,
DC kV .....53.....78
Continuous and load break current,
Amps .....630.....630
Momentary current,
kA asym.....25.6 .....20
Fault-close current, (3 times)
kA asym.....25.6 .....20
One second current,
kA sym.....16 .....12.5
Operations load interrupting endurance (15kV)
at 600A .....500.....350
Mechanical endurance,
operations .....2000....2000

**Fuses can be paralleled for 80 amp. max. capability.*

***Enclosure height = 60.5" (1537), depth = 55" (1397mm).*

**For typical specifications, go to www.gwelec.com. For contact principle, see pages 34-35.**

### AIR CANISTER FUSE RATINGS

| Types of Fuseholders by Voltage Class | Single Holder Fuse Ratings | Parallel Holder Fuse Ratings |
|---|---|---|
| 8.3kV Max. 95kV BIL | 18 to 82 Amp at 4.3kV Max.<br>6 to 72 Amp at 5.5kV Max.<br>1.5 to 40 Amp at 8.3kV Max. | 90 to 164 Amp at 4.3kV Max.<br>80 to 144 Amp at 5.5kV Max.<br>50 to 80 Amp at 8.3kV Max. |
| 15.5kV Max. 125kV BIL | 1.5 to 40 Amp at 15.5kV Max. | 34 to 80 Amp* at 15.5kV Max. |
| 23kV Max. 125kV BIL | 6 to 29 Amp at 23kV Max. | 30 to 58 Amp* at 23kV Max. |

*Voltage class measured line-to-ground.*

**Fuses rated above 25 Amps are required to be non-gassing fuses.*

## Model FI and NI Vacuum Interrupter Mechanism Principle

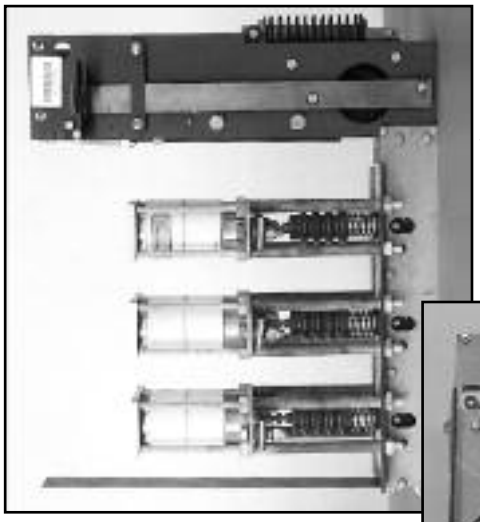
*Add to appropriate switch specifications.*

Ratings for FI modules available through 25kV, with 12.5kA symmetric interrupting. Ratings for NI modules available through 35kV, with 12.5kA, 20kA and 25kA symmetric interrupting.

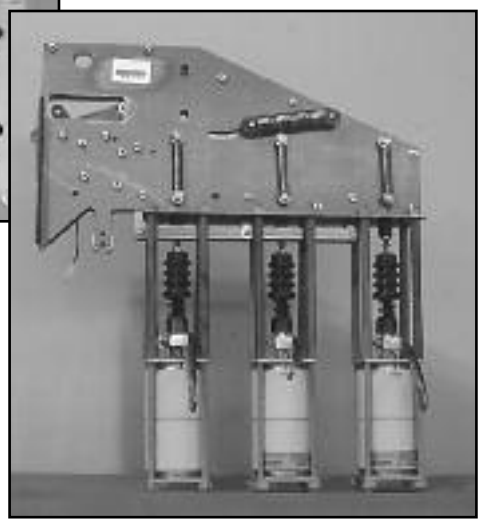
The model FI and NI vacuum interrupters consist of three vacuum bottles mechanically linked to a single spring-assisted operating mechanism. Once initiated, the interrupting time of the vacuum bottles is approximately 3 cycles (50 millisec). A position indicator (open-green, closed-red) driven by the operating mechanism and is visible through a viewing window for positive contact position. The mechanical linkage assembly provides a "trip-free" operation permitting the vacuum interrupter to interrupt independent of the operating handle if closing into a faulted circuit.

The control monitors the current on each phase and activates a trip solenoid to open the three vacuum bottles if an overcurrent on any phase is sensed. The control is self-powered by current transformers mounted inside the sealed switch tank. No external power source is required. Load current is required for the control to be activated unless the optional remote power feature is specified. The trip selector is used to select the time-current response curve for the tap circuits. The time-current response curves are chosen with the phase selector switches on the face plate of the control. Selection of time-current characteristics may be made under load or no-load conditions with continuous current ranges in twelve selectable levels.

The manual trip and reset of the vacuum interrupter is accomplished through a single handle operating all three phases simultaneously.



*Model FI three phase mechanism.*

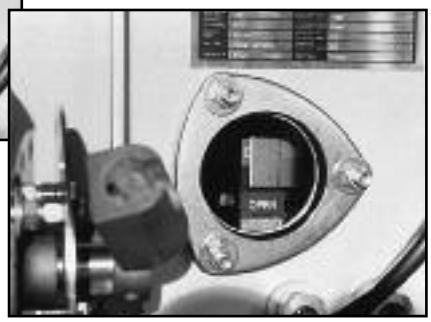


*Model NI three phase mechanism.*

*Three phase interrupter operating handle for manual three phase operation and reset.*

*Motor actuators (below) can be added for remote operation.*

*Position indicators provide visible verification of contact position through viewing windows.*



Motor actuators can be provided. Optional push-button on the controls also permit manual tripping.

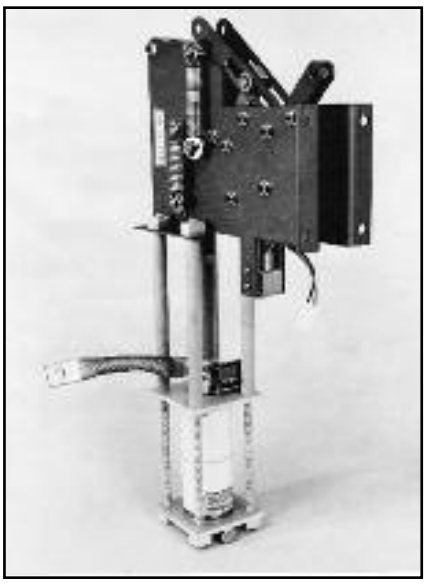
## MODEL VI VACUUM INTERRUPTER MECHANISM PRINCIPLE

*Add to appropriate switch specifications.*

Ratings available through 35kV, with 12kA interrupting with an option for 20kA. Mechanisms are field retro-fittable between single phase and three phase operation.

For single phase operation, the model VI vacuum interrupter consists of a single vacuum bottle mechanically linked to a spring-assisted operating mechanism. For three phase operation, the single phase mechanisms are mechanically linked together with an external operating handle assembly. These mechanisms are field retrofittable between single phase and three phase operation. In both cases, once initiated, the interrupting time of the vacuum bottles is approximately 3 cycles (50 millisec). A position indicator (open-green, closed-red) is mounted to the moving contact and is visible through a viewing window for positive contact position. The mechanical linkage assembly provides a "trip-free" operation permitting the vacuum interrupter to interrupt independent of the operating handle if closing into a faulted circuit.

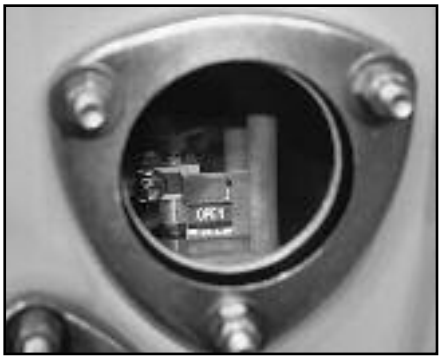
The control monitors the current on each phase and activates a trip solenoid to open one or all three vacuum interrupters if an overcurrent on any phase is sensed. The control is self-powered by current transformers mounted inside the sealed switch tank. No external power source is required. Load current is required for the control to be activated unless the optional remote power feature is specified. The trip selector is used to select the time-current response curve for the tap circuits. Factory setting for single or three phase tripping is standard.



◄ *Single phase VI mechanism.*

*Photos below: Interrupter operating handles for manual single phase (below) or three phase (left) operation and reset. Motor actuators can be added to three phase for remote operation.* ▼


*Position indicators (right) provide contact position indication through viewing windows.* ►


The time-current response curves are chosen with the phase selector switches on the face plate of the control. Selection of time-current characteristics may be made under load or no-load conditions with continuous current ranges in twelve selectable levels.

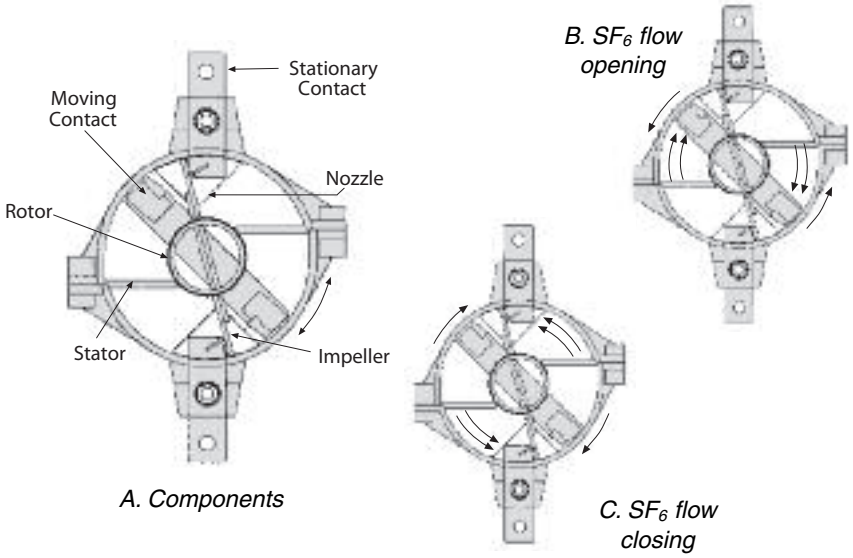
The manual trip and reset of the vacuum interrupter is accomplished through an operating handle. Motor actuators can be provided for remote control. Optional push-button on the control also permits manual tripping.

## Two Position, Rotary Puffer Style

G&W's patented Rotary Puffer (RP) style, two-position switches are ideal for manual load break switching, automatic transfer or automated sectionalizing applications rated through 25kV, 630A continuous. This module allows for the smallest switch footprint. Switches are tested to 500 loadbreak operations at 15kV and 350 operations at 25kV. Switches also tested to 2000 mechanical operations. Current limiting fuses or electronically controlled vacuum interrupters can be added for overcurrent protection. G&W's RP style contact system provides extremely efficient, high speed arc extinction for maximum service life.

▲ *Two position rotary puffer mechanism.*

## Two Position, Rotary Puffer Contact Principle




**A.** The stationary contacts and the multi-chamber rotor (an assembly of interlocking parts which form a rotational framework including moving contacts) are housed in a clear cylindrical shell. The stationary contacts are supported independent of the cable entrance bushings, eliminating possible misalignment resulting from tank deflections. Tank deflections are caused by normal tank pressure variance due to ambient temperature fluctuations. Each rotating contact simultaneously disengages from two stationary contacts, providing two break points per phase. This provides improved interrupting capability as compared to single break contact systems.

**B**. As the rotor tube assembly turns to disengage the moving contact from the stationary contacts, dielectric media ($SF_6$ gas) is compressed between the impeller and stator. The shell, phase barrier and rotor tube also act to confine the gas for proper compression and flow. The compressed $SF_6$ gas is directed through the nozzle into the arc zone. The $SF_6$ flows (is puffed) across the contacts and around the arc established by the separating contacts, cooling the arc over the length of the nozzle. The cooling action is increased by the higher pressure (due to compression) and the flow of gas which constantly provides a supply of cool $SF_6$ into the arc zone.

At current zero, the temperature of the arc is reduced to the point of deionization. The $SF_6$ gas rapidly recovers dielectric strength withstanding the system recovery voltage and preventing re-ignition of current across the contacts.

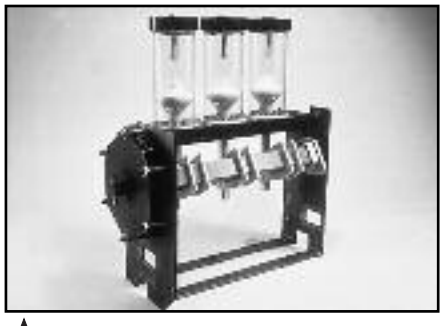
**C.** As the rotor tube assembly turns to engage the moving contact with the stationary contacts, the impeller induces a flow of $SF_6$ gas between the contacts to minimize pre-strike.

## Two Position, Linear Puffer Style

G&W's patented Linear Puffer (LP) style, two-position switches are ideal for heavy duty manual load break switching, automatic transfer or automated sectionalizing applications rated through 35kV, 900A continuous and 40kA asymmetrical short circuit. Switches are tested to 1200 loadbreak and 2000 mechanical operations. Current limiting fuses or electronically controlled vacuum interrupters can be added for overcurrent protection. G&W's LP style contact system provides extremely efficient, high speed arc extinction for maximum service life.

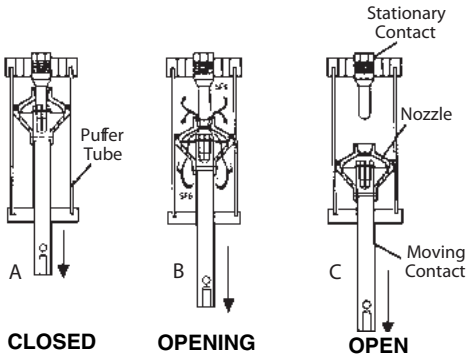
**Stored Energy Mechanism**
Linear puffer switches can be supplied with internal stored energy (cock and trip) mechanisms for both the open and close operators permitting high speed local or remote operation. A separate external trip handle is provided. An optional internal solenoid permits remote operation.

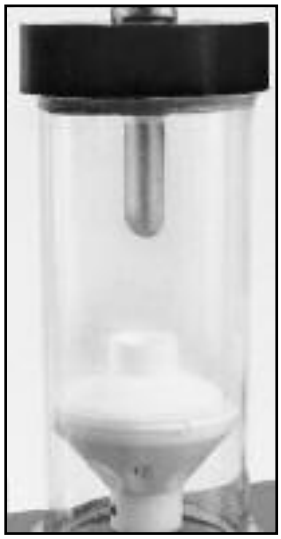
*Three phase visible position of contacts.*



*Three phase linear puffer mechanism.*

## Two Position, Linear Puffer Contact Principle



**A.** The stationary contact and piston assembly (containing the moving contact and nozzle) are housed in clear cylindrical tubes. These are mounted in a modular three-phase assembly which is independent of the switch tank. The stationary contacts are supported independent of the cable entrance bushings, eliminating possible misalignment resulting from tank deflections. Tank deflections are caused by normal tank pressure variance due to ambient temperature fluctuations. This construction eliminates contact alignment difficulties caused by deflections of the switch tank walls. The modular construction also allows testing of the module during assembly and complete flexibility in switch design and configuration. The nozzle which directs the flow of $SF_6$ has a converging/diverging geometry (see photo) which improves the arc interruption capability over designs using straight throated nozzles. The converging portion of the nozzle has a constantly decreasing flow area up to the nozzle throat minimizing velocity changes in the flow of $SF_6$ gas, while improving arc interruption and dielectric recovery.

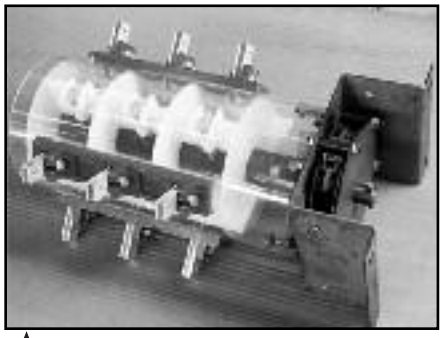
**B.** As the contacts separate, the $SF_6$ is compressed by the piston assembly and directed into the arc zone by the nozzle. The compressed $SF_6$ flows (is puffed) across the contacts and around the arc established by the separating contacts. The cooling action of the gas is increased by the higher pressure (due to compression) and the flow which constantly provides a supply of cool $SF_6$ into the arc zone.

**C.** At current zero the temperature of the arc is reduced to the point of deionization, ceasing the flow of current. The $SF_6$ rapidly recovers dielectric strength withstanding the system recovery voltage across the contacts.

**D**. As the contacts are closing, the piston assembly compresses the $SF_6$ between the contacts. This increases the dielectric strength of the gap, minimizing prestrike. The contacts are designed using a tulip bayonet construction (see photo). The sliding action of the contacts on engagement provides a self cleaning action of the main current carrying sur-faces. The contact fingers are designed for increasing contact pressure with increasing current for proper operation during momentary or close-into-fault conditions. The contacts have arc resistant copper tungsten tips to minimize erosion of material during load switching and prevent damage to the main current transfer area of the contacts.

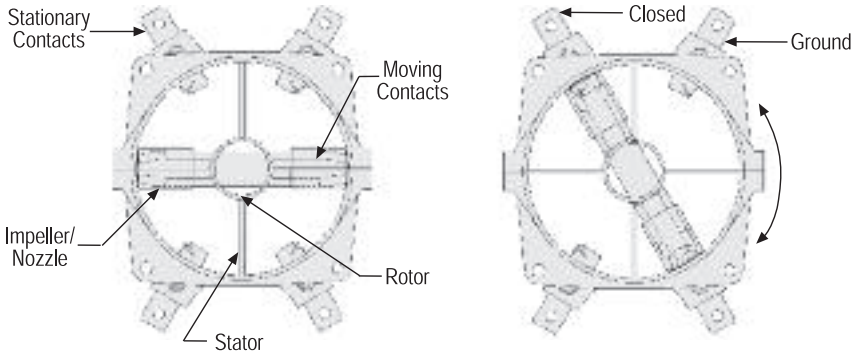
## THREE POSITION, ROTARY PUFFER STYLE

For systems through 35kV, 630A continuous current with 40kA asym. momentary, 32kA asym. close into fault, and 25kA sym. one second current; rotary puffer (RP) style switches are used. G&W's multi-position spring operator permits an integral third switching position to increase the application capability over conventional two position switches. Three position switches combine increased switching flexibility with compact construction.



*Three position rotary puffer mechanism.*

## THREE POSITION, ROTARY PUFFER CONTACT PRINCIPLE




**OPEN** **CLOSED**

**A.** The stationary contacts and the multi-chamber rotor (an assembly of interlocking parts which form a rotational framework including moving contacts) are housed in a clear cylindrical shell. The stationary contacts are supported independent of the cable entrance bushings, eliminating possible misalignment resulting from tank deflections. Tank deflections are caused by normal tank pressure variance due to ambient temperature fluctuations. Each rotating contact simultaneously disengages from two stationary contacts, providing two break points per phase. This provides improved interrupting capability as compared to single break contact systems.

**B**. As the rotor tube assembly turns to disengage the moving contact from the stationary contacts, dielectric media ($SF_6$ gas) is compressed between the impeller and stator. The shell, phase barrier and rotor tube also act to confine the gas for proper compression and flow. The compressed $SF_6$ gas is directed through the nozzle into the arc zone. The $SF_6$ flows (is puffed) across the contacts and around the arc established by the separating contacts, cooling the arc over the length of the nozzle. The cooling action is increased by the higher pressure (due to compression) and the flow of gas which constantly provides a supply of cool $SF_6$ into the arc zone.

**C.** At current zero, the temperature of the arc is reduced to the point of deionization. The $SF_6$ gas rapidly recovers dielectric strength withstanding the system recovery voltage and preventing re-ignition of current across the contacts.

**D.** As the rotor tube assembly turns to engage the moving contact with the stationary contacts, the impeller induces a flow of $SF_6$ gas between the contacts to minimize pre-strike.

## Switch Remote Control Packages

For electrical remote operation, motor actuators can be added. Various control packages are available:

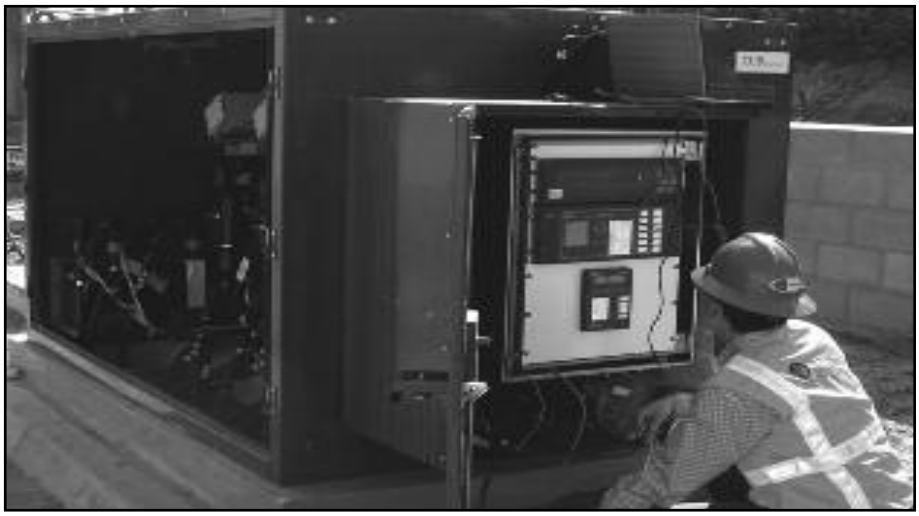
- **Single way controls.**
  Either stationary or portable. Powered by 120VAC or 24VDC and are available with or without battery backup.

- **Multi-way controls**
  Switch controls, such as Schweitzer's SEL 451, are available for applications requiring one control to operate numerous switch ways on one switch or numerous switches from one control.

*Multi-way switch control.*

## Lazer™ Distribution Automation

G&W's Lazer distribution automation system is a pre-engineered control package that works in conjunction with power distribution switchgear to perform automatic switching operations on overhead and underground loop distribution circuits. G&W utilizes over 100 years of industry experience to match the proper switchgear with the proper control for the application. Lazer solutions typically utilize Schweitzer Engineering Laboratories controls, one of the industry's most respected suppliers of quality protective relays.



*Padmount switch with SEL controls.*

Lazer is a protection and control package that features one or more protective relays, equipped with distributed capabilities and peer-to-peer communication to make intelligent operating decisions and to monitor field conditions. Lazer focuses on critical load installations to maximize service reliability.

G&W's Lazer automation system specifically addresses fault detection, isolation and restoration (FDIR) requirements. It continuously monitors the circuit. When it senses an electrical overload or short circuit fault within its protection zone, it issues a command to the appropriate switchgear to trip-open within a pre-determined time delay based on the severity of the fault.

Communication with other upstream and downstream Lazer devices function continually to determine what other actions are required to reconfigure the circuits to automatically restore power to customers connected to the unfaulted lines. The entire process from fault detection to system restoration can typically be completed within 60 seconds or less.

**Communications**
Flexible communication and open protocols are critical for integrating to existing Smart Grids and expanding to handle future needs. Lazer solutions offer flexible communication using hardwired connections, fiber optic cable, or a range of wireless technologies on RS232, RS485, and Ethernet ports. Some of the different protocols available are:

- DNP 3.0
- SEL Mirrored Bits® (proprietary)
- IEC61850 with GOOSE messaging

**Project Examples**
- Distributed automatic transfer including reclosers and SEL-451 controls over fiber optic cable.
- Open Loop FDIR including reclosers and SEL-3351 over radio.
- Load Calculating Restoration including switches, SEL-451-4s. and SEL-3351 over fiber optic.
- Open Loop Upgrade including switches, SEL-451and SEL-751A over fiber optic.
- High Speed Single Phase Tripping Closed Loop including reclosers and SEL-651R over fiber optic cable.

## AUTOMATIC TRANSFER

### ATC 451-4

G&W ATC 451-4 automatic transfer controls are available for G&W $SF_6$ gas switchgear through 38kV. Switches can be dry or submersible vault, padmount or pole mount styles. The two incoming source ways can be located in one switch, or in two separate switches for added redundancy. Manual switches can be retrofitted in the field. Standard transfer times are within 8-10 seconds.


*ATC 451-4 control panel.*

### Features

***Uses SEL 451-4 relay*** - G&W's ATC 451-4 control utilizes the field proven Schweitzer SEL 451-4 relay for its protection logic and programming scheme.

***Plug and play construction*** - The ATC 451-4 is pre-programmed and packaged with all required components to simplify installation and maximize reliable performance. Various styles of NEMA enclosures are available depending on the application.

***Overcurrent protection for two fault interrupting ways*** - The ATC 451-4 can eliminate the need for separate vacuum interrupter controls. Depending on user preference and system protection schemes, various styles of separate interrupter controls are available.

***SCADA* ready** - Each ATC 451-4 comes standard with several serial ports for communication to SCADA systems. Multiple protocols are available including DNP3.0 (standard), Mirrored Bits (standard), and IEC 61850 (option). Ethernet or fiber optic ports for communications are also available options.

***Lazer™ ready*** - The SCADA ready capability simplifies the requirements for communication to other intelligent field devices for automatic power restoration schemes. This simplifies the integration of the ATC into any G&W pre-engineered Lazer automation system where automatic transfer is required.

***Generator source capability*** - The 451-4 can be programmed to permit a standby generator to be used instead of a second utility source.

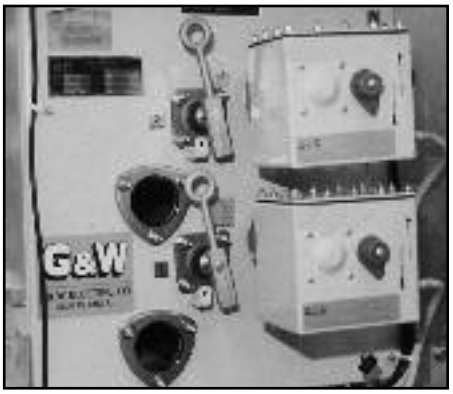
***Bus tie configurations*** - The ATC 451-4 can be used with a bus-tie switch permitting automatic transfer where the load is normally balanced between two sources.

***User friendly controls*** - Large pushbuttons are clearly labeled and provide easy control commands from the front panel.

***Sequence of event recorder*** - Each ATC 451-4 includes a Sequence of Events Recorder which will record the last 1000 entries, including setting changes, powerups, and selectable logic elements.

***Flexible voltage sensing options*** - Integral voltage sensing bushings are available which eliminate the need for cumbersome add-on devices. The bushings are 600A rated, fully submersible, and provide one analog output per phase and one digital output per way for voltage monitoring. Elbow mounted sensors and potential transformers are also available.

### Faster Transfer Speed Options




*Cock-and-trip switch with manual operating handle.*

Switches can be provided with internal cock-and-trip (stored energy) mechanisms permitting transfer times within 15-20 cycles. These switches incorporate an external, hookstick operable handle permitting manual open or close without having to disconnect the motor actuator. Contact G&W if faster transfer times are required.

***Other ATC models are available.***

## Vacuum Interrupter Operation

The overcurrent control monitors the current and sends a trip signal which opens the vacuum interrupters and interrupts the fault current. G&W controls are self-powered from the current transformers located inside the sealed switch tank. Remote trip and remote power connections are available. G&W also offers other manufacturer's controls, such as SEL relays, depending on the application.

### Control Enclosures

Standard control enclosures are NEMA 4X (IP56) rated and are mounted inside the padmount enclosure. Optional submersible enclosures are NEMA 6P (IP67) rated.

### Interrupter Controls

**Type 1** controls operate three, single phase vacuum interrupting mechanisms. The Type 1 can be field set for either single phase or three phase trip mode. It is used on switches with either single phase reset or three phase reset. When in the three phase mode, all three phases trip if the selected trip level of any individual phase is reached. Trip level selections can be made under load or no-load conditions with current ranges in 12 selectable levels. Two ranges of minimum trip settings are available, 15 to 300 amps and 30 to 600 amps. Each unit is preprogrammed with multiple TCCs. The curve selection can be set or changed at any time.

An 8 pole dip switch allows the user to choose the TCC that best matches their individual coordination requirements. A label, located on the inside of the lid, provides a key for the dip switch settings. The control can be factory preset to meet the user's requirements. As protection or coordination requirements change, settings can easily be changed in the field.

Depressing the manual trip button when the control is powered up electronically trips all three phases of the vacuum interrupter. Each control also includes "Last Cause of Trip" LEDs. These LEDs indicate which phase experienced an overcurrent condition, or that the control was given an external or manual trip command.

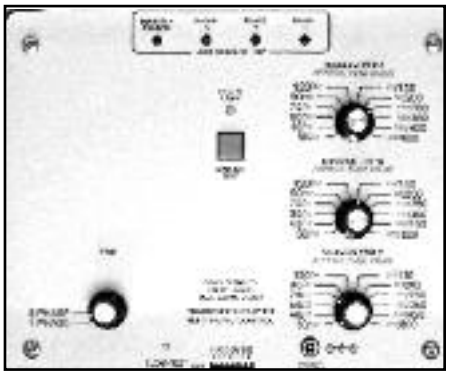
**Type 2** controls offer features similar to Type 1 plus the following additional features:

- Three phase protection only
- Minimum trip set for all three phases with one selector switch
- Adjustable phase time delay
- Ground fault (phase imbalance) with separate adjustable time delay selector switch for protection of large three phase motors or transformers. The ground trip level is represented as a percent of the minimum trip level.
- Instantaneous trip and inrush restraint features

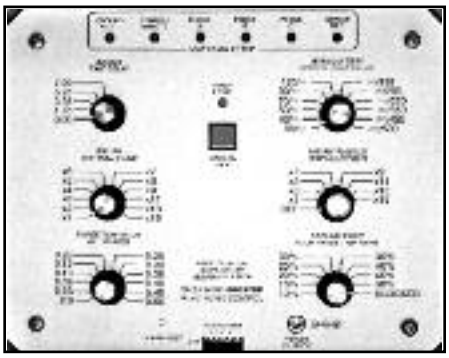
**Type 3** controls offer features similar to Type 2 and more including:

- Single phase or three phase trip
- Vacuum fluorescent display
- Keypad operation for programming parameters and retrieving status of current values
- Multiple TCC curve capability
- Adjustable phase time delay
- Ground fault trip
- Inrush restraint
- Phase identification and magnitude of fault indication
- Readout of real-time current values
- Selectable instantaneous trip
- Selectable minimum response time
- RS232 or RS485 serial interface
- Laptop programming kit available

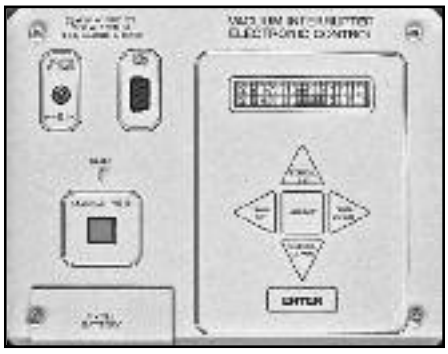
**Type 4** controls provide the same features as Type 3 however, there is no keypad panel, display screen, or manual trip button. The control is programmed using a laptop computer. A laptop programming kit is available.



*Type 1 control*

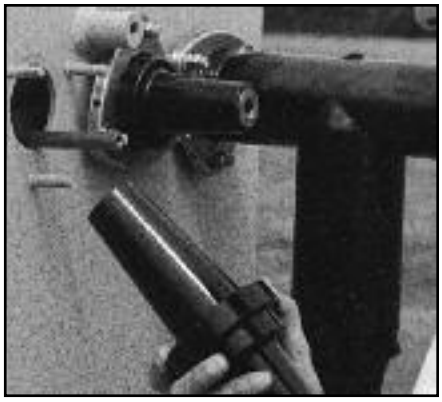


*Type 2 control*



*Type 3 control*

*Type 4 control*



## 3-1/C, 600A Quik-Change Apparatus Bushings

Cable entrance bushings can be damaged at any time due to improper handling, accidental shifting during shipment, elbow failure or even normal wear and tear. In the case of $SF_6$ gas insulated switches where the tank is totally welded, conventional bushing replacement means sending the switch back to the factory for repair. G&W's exclusive Quik-Change Disconnectable Bushing permits quick, easy field replacement without having to open the switch tank.

Bushings are designed to IEEE 386 standards with standard interface accepting conventional elbow style connectors and include an aluminum conductor with 5/8"-11 aluminum threaded stud and aluminum single hole pad **(elbows must be ordered separately).** Copper studs are available. For bottom entry switches, recommended switch frame height is 42" for all voltages.


## 3-1/C, 600A Voltage Sensing Bushings

G&W's Voltage Sensing Bushing (VSB) system is a temperature compensated, built-in, voltage measuring system that eliminates the need for PTs when three phase analog voltage monitoring is required. Compared to potential transformers, the VS bushing system offers these benefits:

- Significant cost savings
- Cleaner, less cumbersome installation
- Less space required
- Fewer add-on components which could potentially fail
- Installed and tested prior to shipment
- Can be field calibrated
- One digital output per way for threshold voltage detection

The VS bushing system utilizes a capacitively coupled screen which is embedded within the epoxy bushing. The low energy output of the screen is amplified by integral circuitry, resulting in a 0-120 VAC analog output suitable for direct connection to any relay, IED or RTU. The circuitry incorporates built-in calibration and temperature compensation which improve accuracy.

Bushings are designed to IEEE 386 standards with standard interface accepting conventional elbow style connectors and include an aluminum conductor with 5/8"-11 aluminum threaded stud and aluminum single hole pad **(elbows must be ordered separately).** Bushings are bolt-on style. Copper studs are available. For bottom entry switches, recommended switch frame height is 42" for all voltages.

**SPECIFICATIONS**

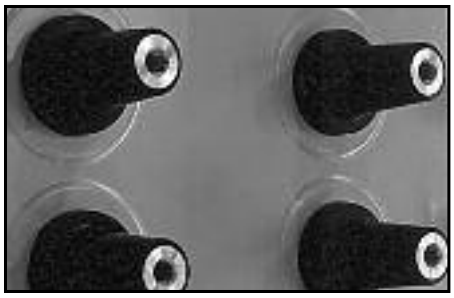
Operating temperature:
-40°C to +65°C
Input voltage range (phase-to-phase):
10.7kV - 38kV
Nominal output voltage: 120 VAC
Analog voltage outputs: 3 or 6
Number of digital outputs: 1 or 2
Digital pick-up voltage:
90% of Vnom (on all phases)
Digital drop-off voltage:
75% of Vnom (on any phase)
Maximum burden (per output): 0.06VA
Voltage accuracy:
+/- 2% from 0°C to 65°C and +/- 5% from -40°C to 0°C.
Voltage signal delay: 1/2 cycle max

## 3-1/C, 600A / 900A Apparatus Bushings

Bushings are designed to IEEE 386 standards with standard interface accepting conventional elbow style connectors and include an aluminum conductor with 5/8"-11 aluminum threaded stud and aluminum single hole pad for a 600A rating **(elbows must be ordered separately).** A copper conductor is available which extends the continuous current rating to 900A. For bottom entry switches, recommended switch frame height is 42" for all voltages. Welded flange bushings are available.

## 3-1/C, 200A Deepwell Bushings

Bushings are designed to IEEE 386 standards with standard interface accepting deadbreak or loadbreak inserts and conventional elbow connectors **(inserts and elbows must be ordered separately).** A copper conductor is standard. For bottom entry switches, recommended switch frame height is 42" for all voltages. Welded flange bushings are available.



## 3-1/C, 600A Apparatus Bushings

### *Welded Flange style*

Bushings are designed to IEEE 386 standards with standard interface accepting conventional elbow style connectors. Bushings include a stainless steel flange and an aluminum conductor with 5/8"-11 aluminum threaded stud. **Elbows must be ordered separately.** 200A deepwell welded flange bushings are also available.

## 3-1/C, 600A Universal Bushings

The combination Universal Cable End and Universal bushing provides an extremely versatile interface between cable and equipment for easy connecting, disconnecting, and isolating of distribution cable circuits. End caps for both bushing and splice module permit dead-ending of the cable and equipment for fast cable sectionalizing if required.

Universal bushings are designed to accept G&W universal bushing cable ends **(G&W Universal bushing cable ends must be ordered separately. See chart below).** An aluminum conductor and aluminum single hole pad is standard. For bottom entry switches, recommended switch frame height is 36" for all voltages. Hi-pot test kits are available.

**NOTE:** Universal bushings can accept up to two G&W Universal bushing cable ends per phase. For applications requiring this feature, consult factory.

## Universal Bushing Cable Ends (per phase)

Complete cable data required before order can be processed.

| Configuration | Catalog Number | |
|---|---|---|
| | 15.5kV | 27kV |
| Terminate 1 cable per phase | 15CE | 27CE |
| Terminate 2 cables per phase | 15CE-CE | 27CE-CE |
| Dead End Kit | 15DCE | 27DCE |
| Change 1 cable per phase to 2 cables per phase* | 151V2 | 271V2 |
| Change 2 cables per phase | 152V1 | 272V1 |

**Kit includes second cable end (CE) and hardware necessary for connection.*

# ACCESSORIES AND OPTIONS

***For standard components, refer to typical specifications at www.gwelec.com under Support.***

***Gas Pressure Gauge and Fill Valve (Standard)***
The pressure gauge is a "GO-NO-GO" style which is color coded to simplify verification of proper operating conditions. A Schraeder type fill valve permits refilling in the field. The gauge and fill valve are made of brass for corrosion resistance. Both components are protected by a steel guard.

***Temperature Compensated Gas Density Gauge (Optional)***
measures internal tank gas density for maximum precision of switch operating conditions. The gauge is colored coded to simplify reading by operating personnel.

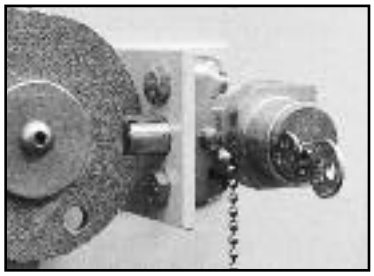
***Viewing Windows (Standard)***
provide a means to visibly verify switch contact position. Single phase or three phase contact viewing is available.

*Auxiliary switches*

***Window Cover (Optional)***
*Available for Type 1, Type 2, or Type 3 interrupter controls.*

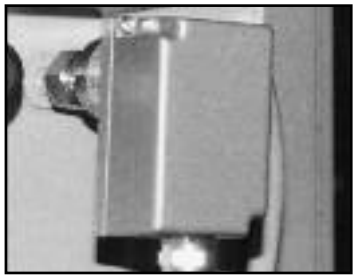
*Pressure gauge and fill valve*


*Temperature compensated gauge*



*Key interlocks*

*Low pressure warning device*



*$SF_6$ density switch*

***Key Interlocks (Optional)***
may be used as an added safety measure to prevent operation by unauthorized personnel or to assure safe coordination of energized equipment. Switches can be provided with provisions only (two maximum per operating mechanism) or with key interlocks factory installed. Specify locking scheme when ordering, i.e. lock in open, lock in closed or lock in both open and closed position. For key interlocks to be coordinated with other equipment, manufacturer's information must be provided.

***Ground Lugs (Optional)***
are bronze, eyebolt style for 4/0 maximum conductor cable.

***Auxiliary Switches (Optional)***
can be included to provide remote indication of contact position. One N.O. and one N.C. contact is supplied and can be wired by G&W or the customer. A maximum of two auxiliary switches can be installed per operating mechanism.

***Low $SF_6$ Remote Monitoring Devices:***
***1) Low Pressure Warning Devices***
are factory set at 5 psig and permit remote indication of internal tank pressure. It can also be used for low pressure control lockout. One Form C contact is provided for wiring by the customer.
***Recommended for installations where ambient temperature does not fall below 0°F (-15°C).***

***2) $SF_6$ Density Switches***
permit remote indication of internal tank gas density to assure proper pressure/temperature operating conditions. One Form C contact is provided for wiring by the customer.
***Recommended for installations where ambient temperatures fall below 0°F (-15°C).***

## OPTIONS

Select from the following options and add to the appropriate switch specification:

- ❑ Stainless steel tank, type 304
- ❑ Stainless steel enclosure, type 304 or 316
- ❑ Temperature compensating pressure gauge
- ❑ Low pressure warning device
- ❑ $SF_6$ density switch
- ❑ 4/0 brass ground lug
- ❑ Key interlock provisions
- ❑ Key interlocks to lock in open position
- ❑ Current transformers for load break ways
- ❑ Potential transformers for voltage monitoring and/or control power
- ❑ Automatic transfer control type ATC451-4
- ❑ Motor actuators for remote switch operation
- ❑ Auxiliary switches for remote switch position indication
- ❑ Stationary switch controls for remote switch operation and SCADA integration
- ❑ Portable switch controls for remote switch operation
- ❑ Remote terminal units and communication packages for SCADA integration
- ❑ Operation counters
- ❑ Voltage sensors with 120 VAC output or a contact to indicate presence of voltage
- ❑ 200A deepwell bushings
- ❑ 600A apparatus bushings
- ❑ 600A voltage sensing bushings
- ❑ 600A Quik-Change apparatus bushings
- ❑ 600A Universal bushings (through 25kV)
- ❑ Type 2 vacuum interrupter control including ground fault trip and time delay selector switches (three phase only)
- ❑ Type 3 vacuum interrupter control including ground fault trip, inrush restraint, programmable vacuum fluorescent display (VFD) and RS232/485 port
- ❑ Type 4 vacuum interrupter control (same as Type 3 with laptop programming only)
- ❑ Clear window cover for Type 1, Type 2, or Type 3 interrupter controls
- ❑ Submersible NEMA 6P enclosure for vacuum interrupter control
- ❑ SEL relays including 751A, 501, 551 and others
- ❑ External power / trip for vacuum interrupter control
- ❑ Refill kit consisting of regulator, hose and $SF_6$ bottle

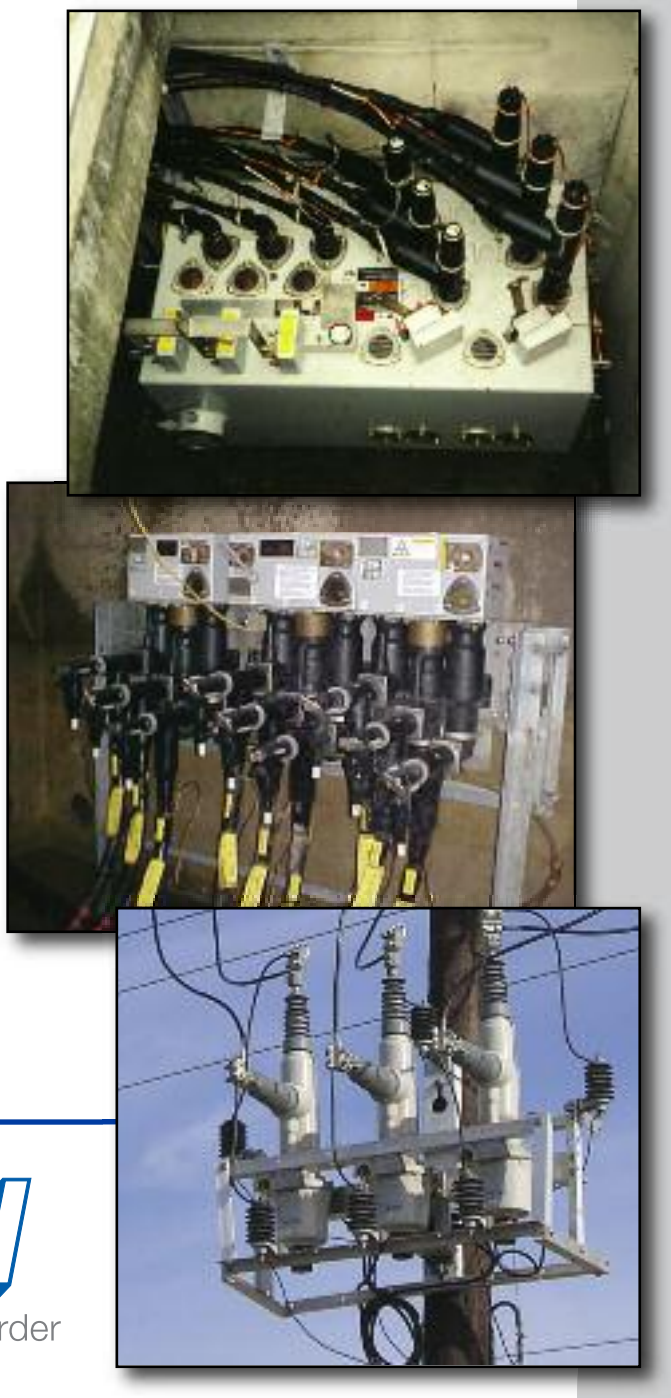
# G&W offers a complete line of distribution voltage switchgear including:

### SF6 Insulated Switchgear
- To 38kV, 25kA interrupting
- Submersible vault and padmount
- Smart Grid / Lazer solutions
- Load and fault interrupting

### Solid Dielectric Switchgear
- To 38kV, 12.5kA interrupting
- Submersible vault and padmount
- Smart Grid / Lazer solutions
- Single phase and three phase

### Solid Dielectric Reclosers
- To 38kV, 12.5kA interrupting
- Overhead, substation and padmount
- Smart Grid / Lazer solutions
- Work with standard SEL controls

### Lazer Distribution Automation
- Multiple levels of protection
- Open, flexible communication
- Pre-engineered, factory tested
- Transfer, loop and network applications



**ISO 9001:2008 Certified Company**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Built to Last


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