G&W Electric

Engineered to order. Built to last.®

Seismically Certified Gas Insulated Switches

After a century of engineering exceptionally long lasting medium-voltage distribution products, G&W Electric knows power. And more importantly, we know the power of listening. By taking time to understand your application and asking the right questions, we develop a solution that precisely matches your needs. The answer may be our time-tested switches that keep power running seamlessly in mission-critical industries, or an advanced automation system for next-generation smart grids. Whatever your challenge, you'll experience decades of high-performance engineering to meet your needs.

Seismically Certified Gas Insulated Switches

We are dedicated to delivering proven solutions that meet and exceed your needs. That's why our engineers ask you questions and listen to find the right solution.

Our seismically certified gas insulated switches provide:

- Load and fault interrupting switching for systems rated through 38kV, 630A and 900A continuous, and 25kA symmetrical interrupting
- Front and bottom access designs
- Dead-front construction
- Compact construction
- Maintenance-free operation
- Mounting flexibility

General Features

Maximum Operator Safety
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. Specially designed frames and enclosures provide robust support for switches installed in seismically active areas.

Minimal Maintenance
G&W Electric's gas insulated switches are corrosion-resistant, totally sealed and factory filled. They eliminate the need for 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.

OSHPD Certified
OSHPD, the Office of Statewide Health Planning and Development, is a government agency in California. Part of its mission is to assure the safety of buildings used by healthcare providers. By International Building Code and California Building Code standards, switchgear is considered to be a non-structural component that is permanently attached to a building or property. Switchgear used in these facilities must undergo seismic testing on a shaker table before being certified for use.

The certification process requires the manufacturer to develop a test plan in conjunction with a Professional Engineer specializing in seismic applications. Prototype switches must be built and tested and upon successful completion of the testing, receive an OSP number (OSHPD Special Seismic Certification Preapproval number) from OSHPD. G&W Electric has a family of switches pre-certified for use on OSHPD projects.

We have tested to the highest level of seismic certification available from OSHPD - level 3 (2.5g). The switches are designed per the guidelines of ASCE (American Society of Civil Engineers) standard 7-05 Chapter 13. These guidelines cover the design of non-structural components installed in a building. The switches also underwent a test regime specified by ICCES- AC-156 (International Code Council Evaluation Services Acceptance Criteria) which specifies the shaker table test inputs applied to the switches. G&W Electric switches can be used in any OSHPD project, in any location in California, and in any location within the building or property. These designs can be supplied without any additional testing, which greatly shortens the leadtime to provide the switchgear.

Application Versatility

Application Versatility - Switch designs are available for two-position (close/ open), 3-phase, load break and resettable vacuum fault interrupter switches. 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 - Padmount, vault, or equipment room type switchgear offer design options include operating handles and bushings mounted for access from the front of the device (front access) or with operating handles on the front with high voltage connections on the bottom of the switch tank (bottom access). Designs equipped for padmount applications feature enclosures that are removable for easy switch installation.

Bushing Variety - Switches for seismically active areas include either an apparatus type bushing or 200A deep well bushing. Also available is the 600A G&W Electric Quik Change apparatus bushing. It is the industry's only field replaceable bushing which can save considerable time and expense should it become damaged during elbow installation.

Visible Break - Load break switches incorporate a visible break of all three phases for operator safety and compliance with many local operating practices.

Overcurrent Protection - Switches are available with optional overcurrent protection up to 25kA symmetrical. These switches include simple to use electronic controls to provide many settings for overcurrent protection. The controls are self powered from current transformers sealed within the switch tank.

Features and Options of Loadbreak Switches with Seismic Certification: SPRAM and RAM Switches:

Loadbreak Switches

G&W Electric's model SPRAM and RAM loadbreak switches include the maintenance benefits of a totally sealed, dead-front, gas insulated device. The switches are designed for manual load break capabilities for systems rated 15.5kV, 27kV, or 38kV, and 40kA asymmetrical momentary and close into fault ratings.

Type SPRAM switches are rated 630A or 900A at 15kV and 25kV. At 35kV the continuous and load break rating is 630A. SPRAM switches include single side access to provide the smallest possible foot print for confined areas.

Type RAM switches are rated 630A or 900A at 15kV and 25kV. At 35kV the continuous and load break rating is 630A. RAM switches provide bushing entrances on the bottom of the tank, making them well suited for replacing many existing G&W Electric designs.

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

Features:

Robust, Corrosion Resistant Construction - Switches come standard with a ¼" thick mild steel tank. The tank comes painted in two part epoxy paint for corrosion resistance. 304/304L stainless steel is available for environments requiring extra corrosion resistance. Switch tanks use welded and gasketed seals and provide extremely robust construction. G&W Electric's switchgear provides decades of reliable service.

Padmount, vault, or equipment room applications - Switches can be equipped with a 12-gauge galvanized steel enclosure. For maximum corrosion resistance, optional 304 stainless steel is available. Enclosures can be painted any color but standard colors include dark green (Munsell 7.0GY3.29/1.5) or light gray (ANSI 70). The switches can also be ordered without an enclosure for indoor applications.

Three Phase Switching - All SPRAM and RAM switches use G&W Electric's patented linear puffer style load break switch mechanism. The linear puffer is a 2-position device (close/ open) and is ideal for heavy duty manual load break switching applications rated through 35kV, 630A and 900A continuous and 40kA asymmetrical short circuit. Switches are tested to 1200 load breaks and 2000 mechanical operations. The linear puffer style contact system provides extremely efficient, high speed arc extinction for maximum service life.

Available Bushings - Either apparatus or deep well style bushings available for high voltage connections to the switch. For 600A applications, G&W Electric offers our Quik Change Apparatus Bushing. This is the industry's only field replaceable apparatus bushing. This unique feature can prevent a switch from needing to be returned to the factory should a bushing become damaged during installation or service. Standard T-body elbow connectors are compatible with G&W Electric apparatus bushings. Also available are 200A deep well bushings, which require the use of 200A inserts and 200A elbow connectors.

Pressure Gauge - The pressure gauge is a "GO-NO-GO" style which is color coded to simplify verification of proper operating conditions.

Pressure gauge and fill valve

Options:

Low Gas Remote Monitoring Devices - Provides an optional low pressure monitoring device set at 5 psig for remote indication of internal tank pressure. It can also be used for low pressure control lockout. One Form C contact is provided and can be wired to an optional factory supplied junction box.

Ground Lugs - Every switch comes with grounding provisions for elbow, cable, and system grounds. Can can also include bronze, eyebolt style ground lugs for 4/0 maximum conductor cable.

Auxiliary Contacts - Auxiliary contacts can be provided for remote monitoring of switch contact positions. The leads can be terminated to an optional junction box.

Mounting Flexibility - SPRAM and PNI switches come standard with 24" minimum bushing height but can be increased to 42" for applications where more space is needed to train cable. RAM switches typically come with 42" high frames to facilitate cable connections to the bushings on the bottom of the tank. Padmount enclosure heights can be as high as 90" and still maintain the seismic rating.

Typical Applications

Typical applications include Loop and Tap Switching.

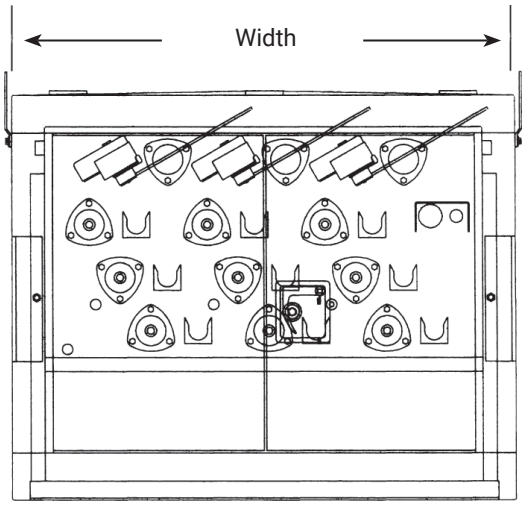
Loadbreak Switches with Seismic Certification

SPRAM Ratings

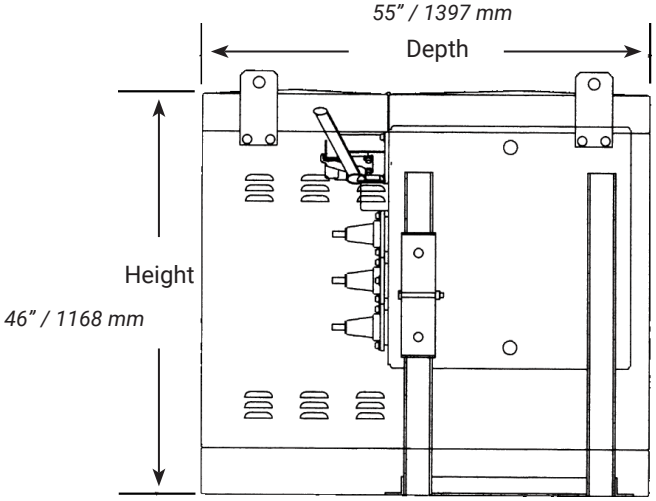
SPRAM Ratings			
Voltage Class (kV)	**15**	**25**	**35**
Maximum Design Voltage kV	15.5	27	38
Impulse level (BIL), kV	110	125	150
One minute withstand, AC kV	35	60	70
One minute withstand, Production test rating, AC kV	34	40	50
15 minute withstand, DC kV	53	78	103
Continuous and load break current, Amps	630 or 900	630 or 900	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 (A)	3000	3000	3000
Operations load interrupting endurance at 600A	1200	1200	1200
Mechanical endurance, operations	2000	2000	2000

Front access SPRAM

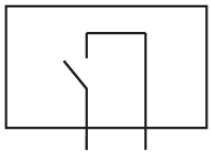
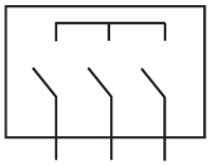
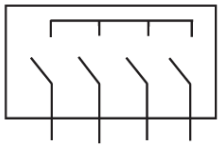
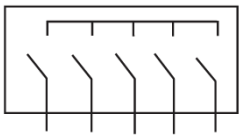
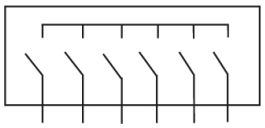
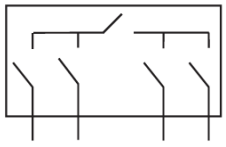
See table below for width dimensions



55” / 1397 mm



SPRAM (Typical Configurations)

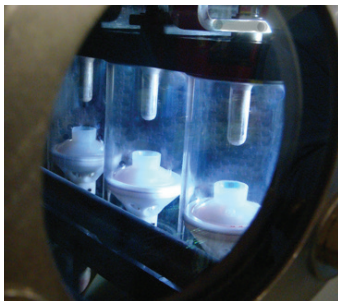
One-line Diagram	Voltage kV	Catalog Number	Width in. (mm)	Approximate Weight w/Gas lbs. (kgs)
	15	SPRAM21-376F-40PI	41 (1045)*	1350 (614)
		SPRAM21-379F-40PI	41 (1045)	1350 (614)
	25	SPRAM21-386F-40PI	41 (1045)	1350 (614)
		SPRAM21-389F-40PI	41 (1045)	1350 (614)
	35	SPRAM21-396F-40PI	41 (1045)	1350 (614)
	15	SPRAM33-376F-40PI	54 (1365)	1700 (773)
		SPRAM33-379F-40PI	54 (1365)	1700 (773)
	25	SPRAM33-386F-40PI	54 (1365)	1700 (773)
		SPRAM33-389F-40PI	54 (1365)	1700 (773)
	35	SPRAM33-396F-40PI	54 (1365)	1700 (773)
	15	SPRAM44-376F-40PI	66 (1680)	2000 (909)
		SPRAM44-379F-40PI	66 (1680)	2000 (909)
	25	SPRAM44-386F-40PI	66 (1680)	2000 (909)
		SPRAM44-389F-40PI	66 (1680)	2000 (909)
	35	SPRAM44-396F-40PI	66 (1680)	2000 (909)
	15	SPRAM55-376F-40PI	79 (1996)	2500 (1136)
		SPRAM55-379F-40PI	79 (1996)	2500 (1136)
	25	SPRAM55-386F-40PI	79 (1996)	2500 (1136)
		SPRAM55-389F-40PI	79 (1996)	2500 (1136)
	35	SPRAM55-396F-40PI	79 (1996)	2500 (1136)
	15	SPRAM66-376F-40PI	91 (2311)	2600 (1182)
		SPRAM66-379F-40PI	91 (2311)	2600 (1182)
	25	SPRAM66-386F-40PI	91 (2311)	2600 (1182)
		SPRAM66-389F-40PI	91 (2311)	2600 (1182)
	35	SPRAM66-396F-40PI	91 (2311)	2600 (1182)
	15	SPRAM45-376F-40PI	79 (1996)	2000 (909)
		SPRAM45-379F-40PI	79 (1996)	2000 (909)
	25	SPRAM45-386F-40PI	79 (1996)	2000 (909)
		SPRAM45-389F-40PI	79 (1996)	2000 (909)
	35	SPRAM45-396F-40PI	79 (1996)	2000 (909)

**630A rated switches have a "6" in the catalog number; e.g. SPRAM21-376F-40PI*
900A rated switches have a "9" in the catalog number; e.g. SPRAM21-379F-40PI

RAM Ratings

RAM Ratings			
Voltage Class (kV)	**15**	**25**	**35**
Maximum Design Voltage kV	15.5	27	38
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 or 900	630 or 900	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 (A)	3000	3000	3000
Operations load interrupting endurance at 600A	1200	1200	1200
Mechanical endurance, operations	2000	2000	2000

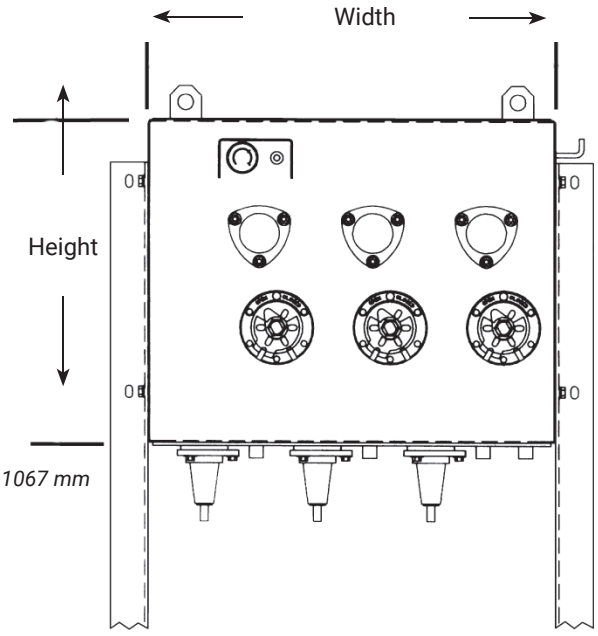
Front access RAM



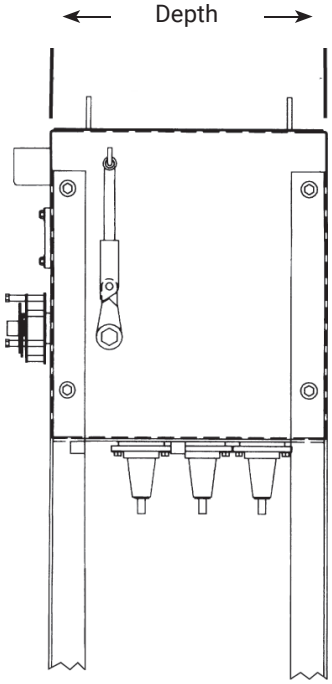
Load break switch visible break.

**Catalog number denotes continuous and load break current*

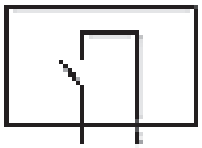
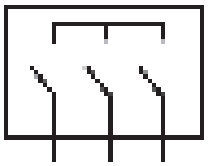
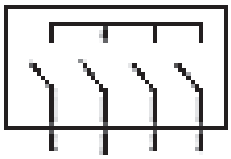
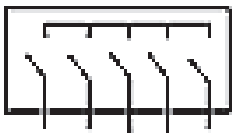
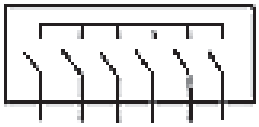
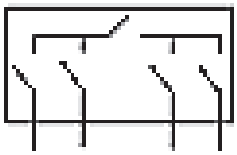
See table below for width dimensions



30” / 792 mm



RAM (Typical Configurations)

One-line Diagram	Voltage kV	Catalog Number	Width in. (mm)	Approximate Weight w/Gas lbs. (kgs)
	15	RAM21-376M-40PI	18 (458)*	300 (136)
		RAM21-379M-40PI	18 (458)	300 (136)
	25	RAM21-386M-40PI	18 (458)	300 (136)
		RAM21-389M-40PI	18 (458)	300 (136)
	35	RAM21-396M-40PI	18 (458)	300 (136)
	15	RAM33-376M-40PI	33 (838)	725 (330)
		RAM33-379M-40PI	33 (838)	725 (330)
	25	RAM33-386M-40PI	33 (838)	725 (330)
		RAM33-389M-40PI	33 (838)	725 (330)
	35	RAM33-396M-40PI	33 (838)	725 (330)
	15	RAM44-376M-40PI	42 (1067)	875 (398)
		RAM44-379M-40PI	42 (1067)	875 (398)
	25	RAM44-386M-40PI	42 (1067)	875 (398)
		RAM44-389M-40PI	42 (1067)	875 (398)
	35	RAM44-396M-40PI	42 (1067)	875 (398)
	15	RAM55-376M-40PI	51 (1295)	1025 (466)
		RAM55-379M-40PI	51 (1295)	1025 (466)
	25	RAM55-386M-40PI	51 (1295)	1025 (466)
		RAM55-389M-40PI	51 (1295)	1025 (466)
	35	RAM55-396M-40PI	51 (1295)	1025 (466)
	15	RAM66-376M-40PI	60 (1524)	1175 (534)
		RAM66-379M-40PI	60 (1524)	1175 (534)
	25	RAM66-386M-40PI	60 (1524)	1175 (534)
		RAM66-389M-40PI	60 (1524)	1175 (534)
	35	RAM66-396M-40PI	60 (1524)	1175 (534)
	15	RAM45-376M-40PI	51 (1295)	1025 (466)
		RAM45-379M-40PI	51 (1295)	1025 (466)
	25	RAM45-386M-40PI	51 (1295)	1025 (466)
		RAM45-389M-40PI	51 (1295)	1025 (466)
	35	RAM45-396M-40PI	51 (1295)	1025 (466)

**630A rated switches have a "6" in the catalog number; e.g. SPRAM21-376F-40PI*
900A rated switches have a "9" in the catalog number; e.g. SPRAM21-379F-40PI

Features and Options of Loadbreak Switches with Seismic Certification: PNI Switches

Load Break Switches
G&W Electric model PNI loadbreak and fault interrupting switches combine the total cost and operating benefits of electronically controlled, resettable overcurrent protection with the safety and maintenance benefits of a totally sealed, dead-front, SF6 insulated device. The switches are designed for automatic fault interruption with manual load break for systems rated 15.5kV, 27kV, or 38kV; 630A and 900A load break and continuous current; and 25kA symmetrical fault interrupting ratings. Designs include single side access to provide the smallest possible foot print for confined areas.

Pressure gauge and fill valve

Pressure Gauge – The pressure gauge is a "GO-NO-GO" style which is color coded to simplify verification of proper operating conditions.

Overcurrent and Fault Protection — PNI switches include solid state electronic controls that are powered from current transformers sealed inside the switch tank. The control monitors the current from each phase and activates a trip solenoid to open the vacuum bottles if an overcurrent or fault condition is sensed. The VI Controls permit accurate, consistent protection curve characteristics compared to conventional fuses. The controls include common time current curves (TCC) for power fuses, relays and fuse links (oil fuse cutouts). Two controls types are available and include the following features:

Type 2 VI control is the standard control for all type PNI switches. It includes simple to use dials and dip switches to program its many protective features:

- Phase overcurrent
- Time delay for phase overcurrent
- Ground fault protection
- Instantaneous current
- Inrush current
- Last cause of trip indicator
- 30 TCC curves pre-programmed into the control

Type 2 control

Type 3 Control is available for seismically active applications. The Type 3 Control is equipped with a vacuum fluorescent display and keypad for programming. The control can also be programmed via computer using G&W Electric's easy to use programming software. The Type 3 Control includes the following features:

- Phase overcurrent
- Time delay for phase overcurrent
- Ground fault protection
- Instantaneous current
- Inrush current
- Minimum response time
- 16 event sequence of event report
- 30 TCC curves pre-programmed into the control

Type 3 control

Options:

Low SF6 Remote Monitoring Devices – An optional low pressure monitoring device set at 5 psig for remote indication of internal tank pressure. It can also be used for low pressure control lockout. One Form C contact is provided and can be wired to a factory supplied junction box.

Ground Lugs – Every switch comes with grounding provisions for elbow, cable, and system grounds but switches can also include bronze, eyebolt style ground lugs for 4/0 maximum conductor cable.

Auxiliary Contacts – Auxiliary contacts can be provided for remote monitoring of switch contact positions. The leads can be terminated to an optional junction box mounted on the switch's padmount enclosure. A maximum of two auxiliary switches can be installed per way.

Mounting Flexibility – PNI switches come standard with 24" minimum bushing height but can be increased to 42" for applications where more space is needed to train cables.

Typical Applications – PNI 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 PNI switches ideal for protecting three phase motors and transformers.

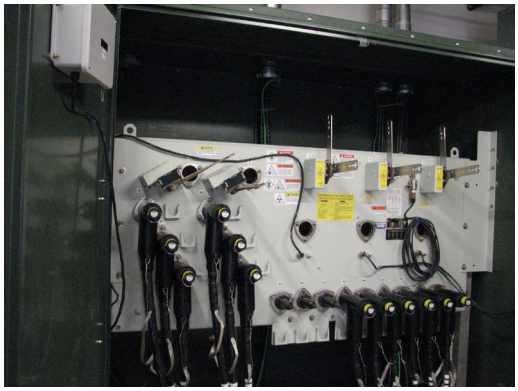
Available 900A Loop Switching — For 15kV and 25kV applications 900A loop switching is accomplished using the latest puffer technology. Tap switching through 630A and up to 25kA symmetric fault protection is accomplished using resettable, electronically controlled vacuum interrupters. The vacuum interrupters also function as load break switches.

Metal Clad Switchgear Replacement — Front access designs can provide up to six 25kA symmetric protected fault interrupter ways for a compact, economical alternative to metal clad and metal enclosed lineups.

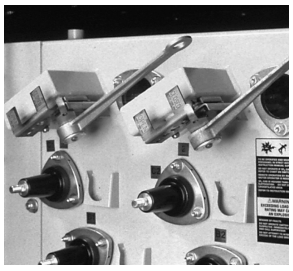
PNI Ratings

PNI Ratings			
Voltage Class (kV)	**15**	**25**	**35**
Maximum Design Voltage kV	15.5	27	38
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
Load break switch open gap withstand (kV) Open gap withstand (kV)	200	200	200
10 operation overload interrupting capability (A)	3000	3000	3000
Operations load interrupting endurance at 600A	1200	1200	1200
Mechanical endurance, operations	2000	2000	2000
Symmetrical interrupting rating (kA)	25	25	25

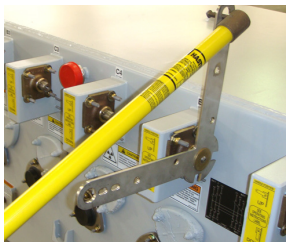
** Available 900A Continuous and load break rating on the load break ways of switches used in loop applications.*



Front access of PNI



Hotstick operable load break handle.

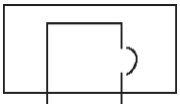
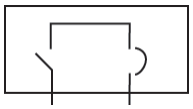
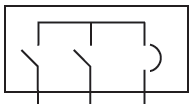
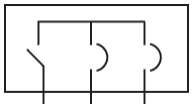
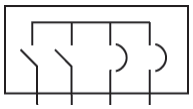
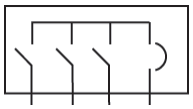
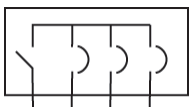
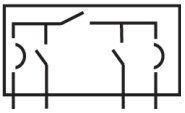
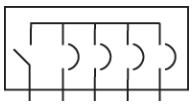


Interrupter with hotstick operable handle.

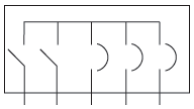
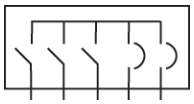
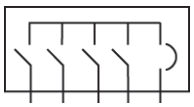
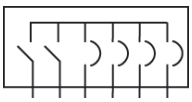
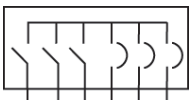
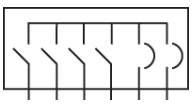
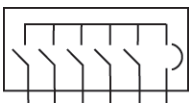
IEEE C37.60 Fault Interrupting Duty

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

PNI (Typical Configurations) *(One-Lines available for PNI switches)*

Model	One-line Diagram	Voltage kV	Catalog Number*	Approximate	
				Width in. (mm)	Weight w/Gas lbs. (kgs)
4F		15	PNI20-376-25-4F	48 (1207)	1500 (682)
		25	PNI20-386-25-4F	48 (1207)	1500 (682)
		35	PNI20-396-25-4F	48 (1207)	1500 (682)
5F		15	PNI21-376-25-5F	48 (1207)	1550 (705)
		25	PNI21-386-25-5F	48 (1207)	1550 (705)
		35	PNI21-396-25-5F	48 (1207)	1550 (705)
6F		15*	PNI32-376-25-6F	63 (1588)	1920 (873)
		25*	PNI32-386-25-6F	63 (1588)	1920 (873)
		35	PNI32-396-25-6F	63 (1588)	1920 (873)
7F		15	PNI31-376-25-7F	63 (1588)	2050 (932)
		25	PNI31-386-25-7F	63 (1588)	2050 (932)
		35	PNI31-396-25-7F	63 (1588)	2050 (932)
9F		15*	PNI42-376-25-9F	78 (1969)	2300 (1045)
		25*	PNI42-386-25-9F	78 (1969)	2300 (1045)
		35	PNI42-396-25-9F	78 (1969)	2300 (1045)
11F		15*	PNI43-376-25-11F	78 (1969)	2400 (1091)
		25*	PNI43-386-25-11F	78 (1969)	2400 (1091)
		35	PNI43-396-25-11F	78 (1969)	2400 (1091)
12F		15	PNI41-376-25-12F	78 (1969)	2400 (1091)
		25	PNI41-386-25-12F	78 (1969)	2400 (1091)
		35	PNI41-396-25-12F	78 (1969)	2400 (1091)
43F		15	PNI43-376-25-43F	93 (2350)	2750 (1250)
		25	PNI43-386-25-43F	93 (2350)	2750 (1250)
		35	PNI43-396-25-43F	93 (2350)	2750 (1250)
51F		15	PNI51-376-25-51F	93 (2350)	2900 (1318)
		25	PNI51-386-25-51F	93 (2350)	2900 (1318)
		35	PNI51-396-25-51F	93 (2350)	2900 (1318)

PNI (Typical Configurations) *(One-Lines available for PNI switches)*

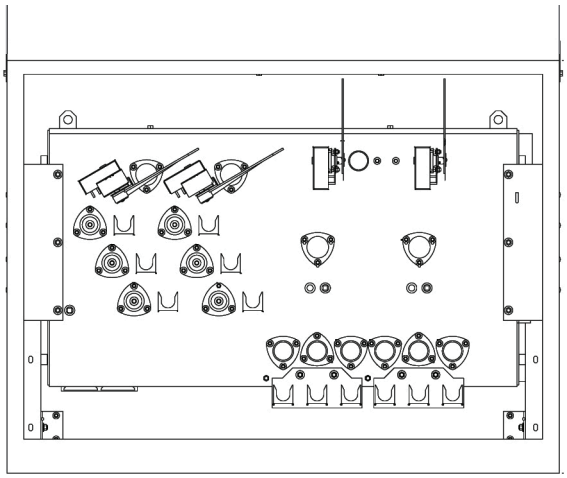
Model	One-line Diagram	Voltage kV	Catalog Number	Width in. (mm)	Weight w/Gas lbs. (kgs)
52F		15 ***	PNI52-376-25-52F	93 (2350)*	2800 (1273)
		25 ***	PNI52-386-25-52F	93 (2350)	2800 (1273)
		35	PNI52-396-25-52F	93 (2350)	2800 (1273)
53F		15 ***	PNI53-376-25-53F	93 (2350)	2750 (1250)
		25 ***	PNI53-386-25-53F	93 (2350)	2750 (1250)
		35	PNI53-396-25-53F	93 (2350)	2750 (1250)
54F		15 ***	PNI54-376-25-54F	93 (2350)	2650 (1205)
		25 ***	PNI54-386-25-54F	93 (2350)	2650 (1205)
		35	PNI54-396-25-54F	93 (2350)	2650 (1205)
62F		15 ***	PNI62-376-25-62F	108 (2731)	3300 (1500)
		25 ***	PNI62-386-25-62F	108 (2731)	3300 (1500)
		35	PNI62-396-25-62F	108 (2731)	3300 (1500)
63F		15 ***	PNI63-376-25-63F	108 (2731)	3200 (1455)
		25 ***	PNI63-386-25-63F	108 (2731)	3200 (1455)
		35	PNI63-396-25-63F	108 (2731)	3200 (1455)
64F		15 ***	PNI64-376-25-64F	108 (2731)	3100 (1409)
		25 ***	PNI64-386-25-64F	108 (2731)	3100 (1409)
		35	PNI64-396-25-64F	108 (2731)	3100 (1409)
65F		15 ***	PNI65-376-25-65F	108 (2731)	3000 (1364)
		25 ***	PNI65-386-25-65F	108 (2731)	3000 (1364)
		35	PNI65-396-25-65F	108 (2731)	3000 (1364)

**The catalog number of the switch will change to designate a 900A rated loop switch. For example, the catalog number for 630A PNI32 is PNI32-376-25-6F. The 900A loop switching version of this device will have a catalog number of PNI32-379-25-6F.*

**** Available 900A Continuous and load break rating on the load break ways of switches used in loop applications.*

See table below for width dimensions

Width



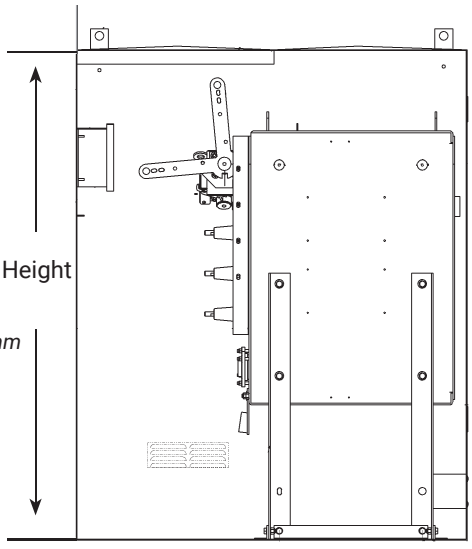
Model PNI-9F

55" / 1397mm

Depth

Height

65" / 1651mm



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