

GENERAL FEATURES FOR SEISMICALLY CERTIFIED SWITCHES

Since 1905, G&W has provided custom power solutions to 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, including those requiring seismic testing and certification. For seismically active areas requiring a device for load switching, line sectionalizing or fault interruption, G&W can provide a solution for distribution system switching and protection. When specifying switchgear for seismically active areas, consider these features:

Maximum Operator Safety

SF6 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. Specially designed frames and enclosures provide robust support for switches installed in seismically active areas.

Minimal Maintenance

G&W SF6 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 nonstructural 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 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 ICC-ES-AC-156 (International Code Council Evaluation Services Acceptance Criteria) which specifies the shaker table test inputs applied to the switches. G&W 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

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.

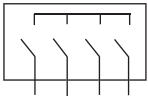
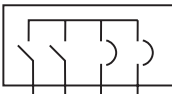
Mounting Flexibility — G&W can provide padmount, vault, or equipment room type switchgear with seismic certification. Design options include operating handles and bushings mounted for access from the front of the device (front access) or with operating handles on the front with high voltage connections on the bottom of the switch tank (bottom access). Designs equipped for pad mount applications feature enclosures that are removable for easy switch installation.

Bushing Variety — G&W switches for seismically active areas include either an apparatus type bushing or 200A deep well bushing. Also available is the 600A G&W 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.

Over Current 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 over current protection. The controls are self powered from current transformers sealed within the switch tank.

TABLE OF CONTENTS

Typical One-Line Diagram	Application	G&W Switch Style	Pages
	Loadbreak Switching	SPRAM RAM	3-5
	Loadbreak Switching and Fault Interrupting	PNI	6-9

FEATURES AND OPTIONS OF LOADBREAK SWITCHES WITH SEISMIC CERTIFICATION TYPE SPRAM AND RAM SWITCHES

Loadbreak Switches

G&W model SPRAM and RAM loadbreak switches include the maintenance benefits of a totally sealed, dead-front, SF6 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 designs.

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

Seismically Certified - In addition, these switches are designed to ASCE 7-05 and tested to ICC-ES-AC-156. ASCE 7-05 Chapter 13 defines the seismic forces the switchgear must withstand during a seismic event. ICC-ES-AC-156 defines the acceptance criteria for the Shaker Table test the switchgear must pass to obtain the seismic certification. The switches are suitable for use in seismically active areas.

Features

Robust, Corrosion Resistant Construction — Switches come standard with a 1/4" thick mild steel tank. The tank comes painted in two part epoxy paint for good 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 switchgear provide 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 G&W type SPRAM and RAM switches use G&W'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. G&W's linear puffer style contact system provides extremely efficient, high speed arc extinction for maximum service life.

Available Bushings - G&W has either apparatus or deep well style bushings available to make high voltage connections to the switch. For 600A applications, G&W 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 apparatus bushings. G&W also offers 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 SF6 Remote Monitoring Devices — G&W can provide 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 G&W 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 — SPRAM 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.

900A Ratings — 15kV and 25kV SPRAM and RAM type switches have are available with a 900A continuous and load break rating

Typical Applications

G&W type SPRAM and RAM switches provide a direct replacement for many existing G&W designs. Typical applications include Loop and Tap Switching.

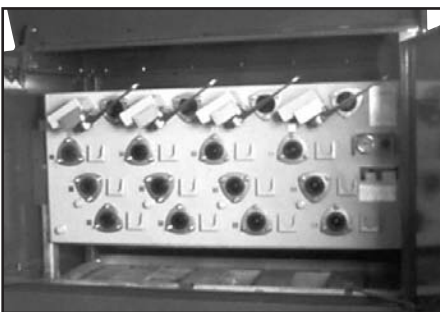
LOADBREAK SWITCHES WITH SEISMIC CERTIFICATION

SPRAM (RATINGS)

Voltage Class (kV)	15	25	35
Maximum design voltage (kV)	15.5	27	38
BIL Impulse (kV)	110	125	150
1 Min Withstand AC (kV)	35	60	70
1 Min Withstand Production test rating AC (kV)	34	40	50
15 Min Withstand DC (kV)	53	78	103
Continuous and load break current (A)	630 or 900	630 or 900	630
Momentary Current (kA) asym	40	40	40
Fault-Close 3-times (kA) asym	40	40	40
1 Sec 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 Operations	2000	2000	2000



◀ Load break switch visible break.



▲ Front access SPRAM44-376F-40PI

SPRAM (TYPICAL CONFIGURATIONS)

One-line Diagram	Voltage (kv)	Catalog Number*	Approximate	
			Width in (mm)	Wt. w/SF ₆ lbs (kg)
	15	SPRAM21-376F-40PI	41 (1045)	1350 (614)
	15	SPRAM21-379F-40PI	41 (1045)	1350 (614)
	25	SPRAM21-386F-40PI	41 (1045)	1350 (614)
	25	SPRAM21-389F-40PI	41 (1045)	1350 (614)
	35	SPRAM21-396F-40PI	41 (1045)	1350 (614)
	15	SPRAM33-376F-40PI	54 (1365)	1700 (773)
	15	SPRAM33-379F-40PI	54 (1365)	1700 (773)
	25	SPRAM33-386F-40PI	54 (1365)	1700 (773)
	25	SPRAM33-389F-40PI	54 (1365)	1700 (773)
	35	SPRAM33-396F-40PI	54 (1365)	1700 (773)
	15	SPRAM44-376F-40PI	66 (1680)	2000 (909)
	15	SPRAM44-379F-40PI	66 (1680)	2000 (909)
	25	SPRAM44-386F-40PI	66 (1680)	2000 (909)
	25	SPRAM44-389F-40PI	66 (1680)	2000 (909)
	35	SPRAM44-396F-40PI	66 (1680)	2000 (909)
	15	SPRAM55-376F-40PI	79 (1996)	2500 (1136)
	15	SPRAM55-379F-40PI	79 (1996)	2500 (1136)
	25	SPRAM55-386F-40PI	79 (1996)	2500 (1136)
	25	SPRAM55-389F-40PI	79 (1996)	2500 (1136)
	35	SPRAM55-396F-40PI	79 (1996)	2500 (1136)
	15	SPRAM66-376F-40PI	91 (2311)	2600 (1182)
	15	SPRAM66-379F-40PI	91 (2311)	2600 (1182)
	25	SPRAM66-386F-40PI	91 (2311)	2600 (1182)
	25	SPRAM66-389F-40PI	91 (2311)	2600 (1182)
	35	SPRAM66-396F-40PI	91 (2311)	2600 (1182)
	15	SPRAM45-376F-40PI	79 (1996)	2000 (909)
	15	SPRAM45-379F-40PI	79 (1996)	2000 (909)
	25	SPRAM45-386F-40PI	79 (1996)	2000 (909)
	25	SPRAM45-389F-40PI	79 (1996)	2000 (909)
	35	SPRAM45-396F-40PI	79 (1996)	2000 (909)

Enclosure depth = 55" (1397mm), height = 46" (1168mm) to as high as 90" depending on bushing height.

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

