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## GIGAVAC Helps Amateur "HAM" Radio Operators Save Lives



When land and cell phones go down in times of disaster such as the recent tsunami in Asia and hurricanes in North America, amateur "HAM" radio operators are often the only source of communication with the outside world to call in emergency assistance and provide updates. GIGAVAC recognizes the value these amateur radio operators



play in making the world a safer place to live. To do its part to make amateur radio operation affordable for the thousands of worldwide volunteers, GIGAVAC has created a special line of high voltage relays just for amateur radio operators-specially priced to make RF switching affordable to these dedicated hobbyists. HAM radio operators no longer have to go through salvage bins to find questionable relays that may fail in time of emergency, because new, affordable relays with a full warranty are available from GIGAVAC.

The response to this new line of affordable relays has been terrific. Here are a just a few of the comments received from amateur "HAM" radio operators.



*I commend you & your company for what you are doing for the public good & amateur radio. I will certainly order your products & use them.*  
~ Seymour Lesonsky M.D., W6CCP

*Your firm is to be commended for supporting the emergency communications capability of amateur radio operators. I will circulate your name widely for both amateur radio requirements and commercial and scientific relay applications I have.*

~ Stuart M. Rohre, K5KVH

*I just read of your new Ham Radio line of vacuum relays in QST magazine. THEN I read your mission statement as it relates to Ham Radio at [www.gigavac.com](http://www.gigavac.com).*

1. *I am virtually speechless that a Company would recognize the contributions of our Hobby, much less go to the R&D and manufacturing*



Stuart Hanebuth (left) & Kenneth Jack at a field day of HAM radio operators

- trouble to build a product specifically for our benefit.
2. I had virtually given up on installing vacuum relays in my amplifier project due to the expense and the perceived unreliability of affordable surplus Jennings or Kilovac units. Your new 5KW relay will suit my needs (pair of Eimac 3-500Z triodes) very nicely at 1.5KW output through 30 MHz. I will be ordering mine immediately.
  3. All I can say to you and your associates is THANK YOU - for recognizing - for caring - and for going beyond the economics to serve a very small, but loyal niche.
  4. I look forward to a future IPO from Gigavac. Your business model will certainly not go unrewarded.

~ Joe T. Milam, W5UA

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## SF6 Gas Filled Relays Preferred for Many HV Applications

GIGAVAC high voltage relays are vacuum or SF6 gas filled. Vacuum is best for RF applications because of low RF losses; and for "make" and "break" applications because the arc is extinguished quickly when the contacts open. However, we have found that SF6 gas is better than vacuum for most other applications because the leakage current is generally lower and more repeatable over long periods of non-operation. Plus, the SF6 gas ionizes during make which increases the ability of the relay to handle high in-rush capacitive type loads. The chart below shows the performance of GIGAVAC relays with different contact materials using vacuum and SF6 gas as the dielectric. For a list of gas filled relays and a more detail explanation visit the "applications" section of our web site under "physics of high voltage relays."

### High Voltage Relay\* Performance Comparison with different dielectric and contact materials

Application	SF6 Gas	SF6 Gas	Vacuum	Vacuum
	<b>Tungsten/Moly(2)</b>	<b>Copper</b> (Special Applications)	<b>Tungsten/Moly(2)</b>	<b>Copper</b>
<b>Carry Only (DC)</b>	<b>GOOD</b> But the gas increases the contact resistance resulting is less current being carried than in vacuum	<b>BETTER</b> than hard contacts but the gas increases the contact resistance resulting is less current being carried than in vacuum	<b>GOOD</b> But not as much current as copper contacts	<b><u>BEST</u></b>
<b>Carry Only (RF)</b>	<b>NO</b> The gas will interfere with the RF carry capabilities	<b>NO</b> The gas will interfere with the RF carry capabilities	<b>GOOD</b> But not as much current as copper contacts	<b><u>BEST</u></b>
<b>Make &amp; Break*</b>	<b>GOOD</b> for make but only low currents on break	<b>GOOD</b> for make but only low currents on break	<b><u>BEST</u></b>	<b>FAIR</b> Extremely low currents only
<b>Make Only**</b>	<b><u>BEST</u></b>	<b>BETTER</b> But not as good as hard contacts	<b>GOOD</b> But not as much current as copper contacts	<b>FAIR</b> Extremely low currents only
<b>Long Periods of Non-Use</b>	<b><u>BEST</u></b> Only relays listed "Make only"	<b>BETTER</b> than hard contacts but the gas increases the	<b>GOOD</b> Generally will "burp" when HV is applied	<b>GOOD</b> Generally will "burp" when HV is applied

<p><b>Or where</b></p> <p><b>Low and Stable Leakage Current Is Needed</b></p>		<p>contact resistance resulting is less current being carried than in vacuum</p>		
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- ❗ Does not apply to GIGAVAC reed relays
- ❗❗ Contact GIGAVAC for specific make and break relay ratings in your application

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## More High Voltage Experts Join the GIGAVAC Team



To better meet your needs, two high voltage experts joined GIGAVAC in 2004. **Rodney Nash**, with over seven years experience in high voltage relay applications has been named Manager of Technical Services. He will be

working directly with you and our sales reps to solve application issues on a daily basis, as well as heading up our test lab where we do qualification and special testing for customer-specific applications.



**Brent Swartzentruber** has joined GIGAVAC as the Director of Product Development. He has over nine years experience in relay design, holds two U.S. patents for relays and has a Bachelor of Science degree from University of California Santa Barbara. Brent also has over 15 years experience in high vacuum product

design that is so critical for small, extremely reliable sealed high voltage relays. Brent will be heading up the development of several new high voltage relays that we plan to announce in 2005.

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## New G12 Double Pole, Double Throw Relay is Great for Polarity Reversal

Up until now, double pole, double throw high voltage relays have not been easy to find, so GIGAVAC developed the all-new G12, 8 kV vacuum relay-great for applications requiring high voltage power reversal and low leakage-such as test and medical equipment. Because polarity can be reversed simply with the G12 relay, the need for a second high voltage power supply can often be eliminated to save money. The G12 is only 33mm in diameter (including terminals) and 29mm high, and is likely the smallest DPDT high voltage relay with its voltage and current rating in the industry. The G12 can carry a hefty 10 amps. It also has GIGAVAC's

exclusive changeable coil feature that allows users to change the coil even after the relay has been installed. If your application requires a high current "make," contact Jim Lanum at our headquarters near Santa Barbara. It's likely we have a gas filled version that may be just the answer for your high current in-rush application.

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## Applications Specific Testing - No Problem for GIGAVAC

All GIGAVAC relays are 100% tested for operational and high voltage characteristics, but some relays require extra testing to ensure failure-free performance in a specific application. Since the experts at GIGAVAC understand this

issue, we are equipped and ready to do just about any test you may need. For instance, to ensure that relays will have a low and stable high voltage leakage current over long periods of time, GIGAVAC can perform additional micro-discharge testing. Alternatively, to assure that every relay will act the same for ESD testers, GIGAVAC can test its relays for discharge waveform to IEC6100-4-2. Whatever your application requires, don't hesitate to contact the experts at GIGAVAC. We consider your special test requirements as important as the relay selection.

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## High Current G52 Relay Reduces Relay Count

The new 150 Amp 25 kV G52 vacuum relay is ideal for low-cost, high current switching for equipment used in the fabrication of the new, larger 300mm silicone wafers. At a system frequency of 13.6 MHz, the GIGAVAC G52 carries 75 amps, which is four times the current of other relays, easily cutting relay system costs in half.

The G52 is a single pole, double throw vacuum relay with a 150 amp DC carry rating and can be used for other applications such as test equipment, airport lighting, medical and undersea cable. It has internal shielding, which is excellent for hot switching lower currents. The G52 is

61mm in diameter, 100mm tall and comes with through-panel flange mounting that keeps the high voltage and control circuits far apart-to eliminate cross talk and any chance of high voltage shorts to the coil circuit. It is available with 12 Vdc, 26.5 Vdc, and 115 Vdc coils with special orders available upon request; plus has GIGAVAC's exclusive changeable coil feature that allows users to change the coil even after the relay has been installed. For more information, contact the GIGAVAC sales representative in your area or contact us at our headquarters near Santa Barbara.

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## Relays in Stock When You Need Them

With over 243 finished part numbers and thousands of relays in stock, GIGAVAC continues to lead the industry with more finished high voltage relays in stock than any other supplier. Because GIGAVAC is the expert in high voltage relays, we know what relays you need and most often ship them the same day you place your order. Our foreign reps and distributors also have relays in stock; and if they do not, we ship to them overnight so you can get the relay you need quickly- in your country, using your own currency. Plus, GIGAVAC accepts most major credit cards (Visa, MasterCard, American Express). Try us! You will be favorably impressed!

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## Applications Section of Web Site Expands

When you want to know "WHY"-[www.gigavac.com](http://www.gigavac.com) is the place to get high voltage relay answers quickly. Expanding on what is already considered one of the best resources in the industry (listed tops by most of the popular search engines) [www.gigavac.com](http://www.gigavac.com) has expanded and added many new topics to the applications section. Try it the next time you need to select a high voltage relay-because it's easy, fast and intuitive-allowing you to get into the details only when you need it. In addition to being able to select two different levels of expertise in your search, now you can find detailed information on the physics of our high voltage relays, lists of relays recommended for particular applications and simple, easy-to-understand explanations for all of our recommendations. There are also some helpful hints on coil suppression techniques and instructions how to change many GIGAVAC relay coils. Visit the expanded applications section for answers to many of your high voltage relay needs AND always feel free to contact our sales reps or our company headquarters near Santa Barbara with any of your questions.

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## GIGAVAC Has Relays for Sinusoidal Waveform Heart Defibrillators

For years, the sinusoidal waveform has been the world standard for heart defibrillators.



Companies such as Physio Controls, Zoll Medical, Hewlett Packard, BPL and others have supplied thousands of heart defibrillators that saved hundreds of thousands of lives. A high voltage gas filled relay is typically used in these defibrillators to discharge a capacitor to the patient (patient relay). In recent times, however, a new bi-phasic waveform has been used that does not require a gas filled high voltage patient relay. As a result, the price and lead-time of the "OEM" patient relays has increased to the point where manufacturers in third world countries cannot continue production plus repair depots cannot maintain the thousands of defibrillators in the field. The experts at GIGAVAC recognized this problem and came up with a simple, low cost solution.



By modifying the G12 relay for higher voltage operation, GIGAVAC has created a universal patient relay that can be used in just about every application where the OEM relay was used. This new G17 relay is not a drop in replacement, but with its flying leads and traditional mounting tabs, it can be adapted to work in most sinusoidal style defibrillators. For more information on this new universal relay, contact the GIGAVAC sales rep in your area or Jim Lanum at our headquarters near Santa Barbara.

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### **GIGAVAC Sealed 70 kV Relay Priced LOWER than Competitor's 35 kV Rated Relay**

The GIGAVAC sealed G71 relay is priced lower than competitors' 35 kV relay-and they are the same size. If you want to reduce the cost of your system or desire an extra margin of safety, consider using our discount coupon to evaluate the husky G71. Want to save even more money? Consider GIGAVAC's G61 relay that is a form-fit-function replacement for the competitor's 35 kV relay. Both relays are generally in stock for immediate delivery.

"We're taking the worry out of high voltage," said Jim Lanum, GIGAVAC's VP Sales, "Safety is our number one concern which is why we use SF6 inside the G71. The relay emits no x-rays and has the lowest leakage current over long periods of time compared with vacuum relays. Not only is it safer, but also it is shorter and will operate at a lower temperature-and bottom line, it's priced LOWER."

### **50% Discount on GIGAVAC relays**

GIGAVAC relays are already the lowest priced sealed relays in the industry. So take advantage of this incredible first-time offer to experience the highest quality relays right away-with all the service and support you expect from us-the industry experts.

Plus, we will accept other high voltage relay manufacturers' coupons as well as offering 50% discounts for new applications (whatever discount is greater). Don't have a competitor's coupon? No problem, use this one for 50% discount off our normal low prices; plus we will ship immediately. GIGAVAC will honor either discount, worldwide, for any quantity up to three pieces through June 30, 2005.

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### **50% Discount on GIGAVAC relays**

This coupon is valid for the purchase of any GIGAVAC relay used in a new application not currently supplied by GIGAVAC, (not applicable to already discounted "HAM" relays). Coupon must accompany the order and cannot be combined with other coupons. Coupon valid for up to three pieces for orders received through June 30, 2005. GIGAVAC may terminate this offer anytime at its discretion.

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GIGAVAC® - P.O. Box 4428 - Santa Barbara, CA 93140-4428 - ph +(805) 684-8401 - +(805) 755-2000  
fx +(805) 684-8402 - - [www.gigavac.com](http://www.gigavac.com) - ©[Copyright](#) 2003-2010 GIGAVAC, LLC.