Product Information



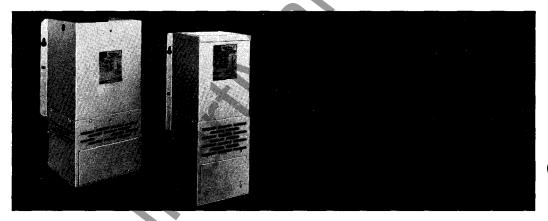
Power Conditioning Equipment

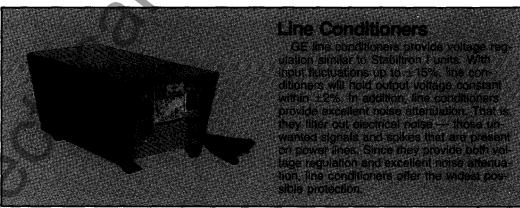


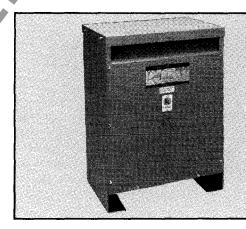


Voltage problems that were considered relatively minor just a few years ago are now causing serious problems. Erratic voltage for even a fraction of a second can cause electronic and other voltagesensitive equipment to malfunction. Worse yet is the damage that occurs to computer systems where the memory can be lost, equipment damaged, or the entire system shut down completely.

Fortunately, there is an economical solution to these problems. General Electric's power conditioning equipment is especially designed to prevent voltage problems from developing. This catalog will enable you to select the proper product to protect your investment in computers and other sophisticated electronic equipment.

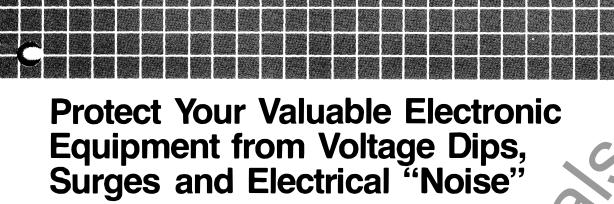






Guard I[™] Noise Isolation Transformers

Guard I noise isolation transformers do not provide voltage regulation. But, they do provide excellent common mode noise attentuation. And, they do offer other advantages. They are generally less expensive than alternative methods of electrical noise attenuation, and there are more voltage combinations available from which to select. Also, since they are available in larger power ratings, noise isolation transformers can be used on a feeder system to protect all equipment on the line.



Dips, Surges, and Noise Occur All Too Frequently

With today's widespread use of computers and other sophisticated electronic circuitry, the "dirty" power sometimes delivered by utilities can be devastating. Dirty power results from the voltage dips and surges that occur on utility lines — as frequently as several times a week in some cases. Electrical "noise" is still another problem. It occurs when static interference or other unwanted signals are fed back into the electrical circuit.

Voltage dips can occur when there is a fault on the electrical system such as a short circuit. Or they can result from sudden increases in load. Power surges are the opposite of dips and happen frequently during lightning storms. Surges also can result from switching of heavy equipment during the opening or reclosing of breakers.

Electrical "noise" is a relatively new concern. It is most acute in heavily built-up electrical environments, such as mills, factories, large office complexes, and supermarkets. The noise is comprised of unwanted signals and spikes that are present on a power line. Excessive noise may cause sensitive electronic equipment, such as micro-processors and computers, to process data erroneously. As a result, equipment operators are forced to spend precious time doing unproductive work—unscrambling false outputs, replacing lost

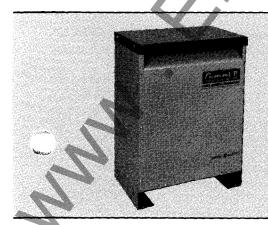
programs, and repairing damaged terminal boards.

High and Low Voltage

Today's electronic and electrical equipment is highly sophisticated and automated. In turn, it needs highly stable, constant voltage in order to function properly. Unfortunately, for many reasons, utilities are not always able to deliver precise, stable voltage to industrial users. Because of this, special steps must be taken to control or regulate erratic voltage.

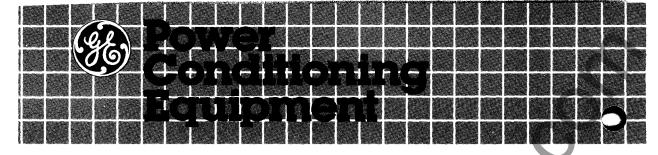
Voltage can be too high or too low for varying lengths of time. It can be **consistently** too high or low, depending on whether it is near the beginning or end of the electrical distribution system. This is a chronic condition that can readily be controlled with a buck-boost transformer.

Voltage can be **temporarily** too high or too low. It may be too high in the electrical lab during the evening when all other power in the factory has been shut down. But, the problem will disappear the next day when normal activity resumes. Conversely, voltage can be temporarily too low. A classic example occurs during brown-out conditions, when utilities deliberately reduce voltage in order to conserve power during peak loads. Usually, normal service is restored after a brief period.



Guard II[™] Noise Isolation Transformers

Guard II noise isolation transformers provide the ultimate in protection from "dirty" power problems. Noise suppression components combined with an electrostatic shield offer excellent common and transverse mode noise attenuation. Additional protection is also provided by spike/surge suppression components. They are furnished in attractive brown and beige enclosures that are compatible with office and computer room decors. When clean power is a must, select a Guard II noise isolation transformer.



Voltage can also be too high or low on a **momentary** basis — for a fleeting moment. These phenomena are called voltage surges when they are too high, and voltage dips when they are too low. This is an acute condition that requires constant vigilance in order to protect valuable equipment. Figure 1 shows a voltage dip, and Figure 2 shows a voltage surge.

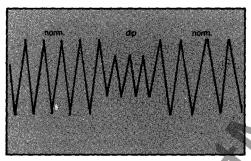


Fig. 1 Voltage dip — a momentary drop in voltage can be caused by a malfunction on the utility power system.

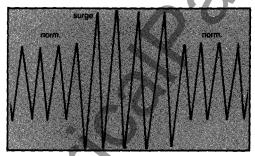


Fig. 2 Voltage surge — a momentary increase in voltage can be caused when heavy electric loads are switched on or off.

Coping with Dips, Surges

Businesses that require a reliable source of constant voltage have relatively few options to solve their problems. Although dedicated lines are sometimes offered as a solution, they are not really viable. While they may offer some protection against electrical noise problems, dedicated lines are at risk in protecting against voltage fluctuation.

General Electric Stabiltron I voltage stabilizers and line conditioners both provide excellent voltage regulation to protect against voltage dips and surges. Although Stabiltron I units offer somewhat more precise voltage regulation than line conditioners, they both offer complete protection for most applications. (See Figure 3). The principal difference between the two is that line conditioners also provide superior electrical noise attenuation.



Fig. 3 Voltage regulation is provided by both GE Stabiltron I units and line conditioners.

Electrical Noise

Electrical noise is comprised of unwanted signals that are present on power lines. These signals show up as a series of spikes and dips on a sine wave. (See Figure 4) Conversely, the absence of any noise would result in a perfect sine wave as in Figure 5.

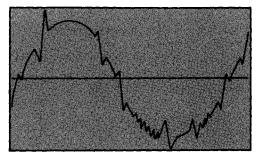


Fig. 4 Noise shows up as spikes and dips on a sine wave.

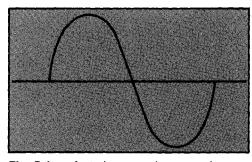
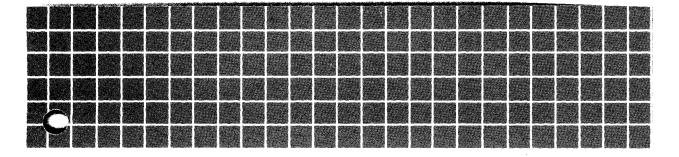


Fig. 5 A perfect sine wave has no noise.

Unwanted electrical noise appears in two forms: common mode noise and transverse mode noise. The difference between the two is simply a matter of where the noise is generated. As shown in Figure 6, common mode noise appears between ground and neutral (A), or between ground and the hot line (B). Normally, common mode noise occurs much more frequently than transverse mode noise. Transverse mode noise is measured between neutral and the hot line (C).



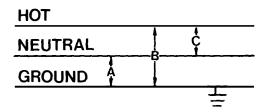


Fig. 6 Common mode noise occurs in the area represented by (A) and (B), while transverse mode noise is reflected in the area designated by (C).



Sources that typically cause common mode noise include lightning, the opening of electrical contacts, grounding faults, poor grounds, radio transmitters, ignition systems, poor brush contacts on motors, and any time an arc is struck.

The source for transverse mode noise is somewhat different. These disturbances are caused by the firing of SCR's, welders, ignitors, switching power supplies, electrical storms, and utility switching.

In any event, the result of electrical noise on a power line, whether it be common mode or transverse mode, is about the same — it all has an adverse effect on equipment operation. Too often, users of electronic equipment realize they need to eliminate noise (noise attenuation) only after their equipment suffers a casualty. Actually, any critical load sensitive to electrical noise should be protected by either a GE line conditioner or noise isolation transformer.

Noise Attenuation

GE line conditioners and noise isolation transformers are specifically designed to provide electrical noise attentuation. That is, they will eliminate spikes and dips from the sine wave as shown in Figure 7.

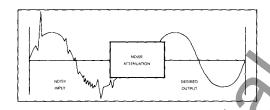


Fig. 7 Noise attenuation means that spikes and dips are removed from the sine wave.

Line conditioners provide a high degree of attenuation, and even the most critical application will be well protected from electrical noise. Typically, an individual unit is used to protect one or two pieces of sensitive electronic equipment in a circuit.

Guard I and Guard II noise isolation transformers also provide noise attenuation. Guard I units are not as effective as line conditioners in suppressing transverse mode noise, however, they will suffice for a large number of applications. Guard II units provide excellent common and transverse mode noise attenuation along with surge and spike suppression.

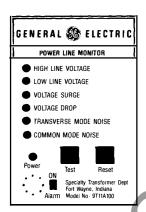
Noise isolation transformers offer a broad scope of selectivity. They are available in both one and three-phase ratings, and have a variety of voltage arrangements from which to select. Ratings up to 500 kVA are available from stock. Because noise isolation transformers are available in these large power ratings, they are frequently used ahead of panels to protect all equipment on a given circuit.

To sum up, Guard I and Guard II noise isolation transformers are effective noise attenuators, while Stabiltron I units provide precise voltage regulation. And, GE line conditioners perform both functions. In addition, line conditioners offer flexibility of application, they protect electronic equipment against extreme conditions, and they require no attention to operate or maintain. Accordingly, they are an effective and economical solution to most power supply problems.



Power Line Monitor

It's now easier than ever to analyze your power line problems . . . and select the General Electric power conditioning equipment to solve those problems. Simply use the General Electric power line monitor.



Power line monitor (front view) showing voltage conditions that can be monitored.



Power line monitor (back view) showing solutions to any problems that are identified.

...identifies power line disturbances

The General Electric power line monitor offers uncomplicated, economical analysis of power line disturbances. Simply plug the portable monitor into the power outlet that is to be monitored. It will indicate power disturbances by activating a red light and sounding an alarm. The light and alarm stay on until the reset button is pressed. (The alarm can be switched off if it is not required). A test button thoroughly tests the unit.



Available for 120 volts a-c, 50/60 Hz applications, the monitor comes with a card that suggests possible causes and solutions for each type of power line disturbance. Solutions are also included on the back of the unit.

Application

The power line monitor should be used whenever an economical approach to power line monitoring is desired. It provides a quick indication of disturbances that are present. Its specifications are compatible with computer, communications, medical, test, and other electronic equipment. The monitor will identify the following distrubances: high line voltage, low line voltage, voltage surge, voltage drop, transverse mode noise, and common mode noise.

Preset alarm thresholds

High Line More than 125 Vrms \pm 3% for Voltage: more than 100 ms \pm 10% Low Line Less than 105 Vrms ± 3% for Voltage: more than 100 ms \pm 10% Voltage More than 200 V peak ± 10% for Surge: more than 10 μ s \pm 10% Voltage Less than 80 Vrms ± 10% for Drop: more than 20 ms \pm 10% Common More than 2V pp ± 10% for more Mode Noise: than 50 ms ± 10% @ 100 Khz Transverse More than 2V pp \pm 10% for more than 50 ms \pm 10% @ 100 Khz. Mode:

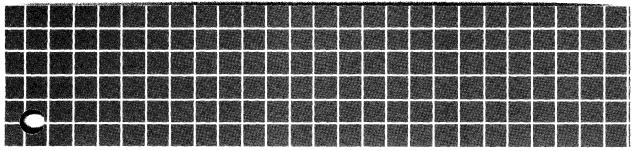
Specifications

Model Number: 9T11A100 (Normally in factory stock)

Rating: 120 volts a-c, 50/60 Hz

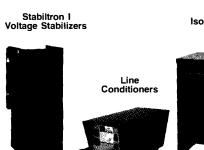
Weight: 2 pounds

Dimensions: 6.2" L X 3.5" W x 2.1" H



Selection Guide

If you don't have a GE power line monitor, use this handy selection guide. You'll find a full line of power conditioning equipment. Use this guide to identify the GE product that's best for your application. Then, turn to the proper section of this catalog to select the specific model that's right for your job.



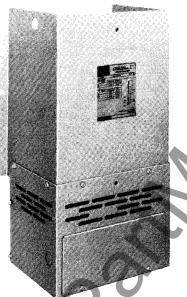
Noise Isolation Transformers

isolation transformers	
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Function	Line Conditioner	Transf	solation ormers ie 16)
To Be Performed	Conditioner (Page 13)		Guard II
Circuit isolation between primary & secondary	Yes	Yes	Yes
Voltage transformation between primary & secondary	Yes	Yes	Yes
Voltage Stabilization	The second secon	No	No
Voltage stabilization response within 30 msec.	Yes	No	No
Continuity of output voltage during a primary circuit interruption of 5 msec. or less	Yés	No	No
Common mode noise suppression	Excellent	Excellent	Excellent
Transverse mode noise suppression	Extellen	Fair	Excellent
Problem To Be Corrected			
Source voltage that varies widely from nominal rating	Yes	No ,	No
Voltage spikes from switching operations or lightning discharges	Yes	Yes	Yes
Utility circuit voltage reduction (Brownout)	Yes	No	No
Source circuit inter- ruption of 5 msec. or less	Yes	No	No
Source voltage containing both transverse and common mode noise, 1-500KHz range	Excellent	Fair	Excellent
Source voltage containing only common mode noise	Excellent	Excellent	Excellent



Stabiltron I Voltage Stabilizers



...for precise, constant voltage

General Electric's Stabiltron I AC line voltage stabilizer is a static-magnetic transformer-type device. It allows you to maintain output voltage within $\pm 1\%$ of the nominal voltage, even with input voltage fluctuations of $\pm 15\%$.

Voltage stabilization is performed by highly reliable magnetic and conseiter circuits.

reliable magnetic and capacitor circuitry. Stabiltron I is available in filtered designs for computers and other electronic equipment, and in nonfiltered units for use with properly designed rectifier circuits and loads needing RMS voltage only (such as lighting and filament heating).

Unique features

- Filtered units: UL Listed and CSA Certified
- Totally enclosed construction, with no exposed core material.
- No moving parts, for longer life, less maintenance.
- Low case temperature.
- Expanded voltage input and output ranges.
- Instantaneous response to voltage fluctuations.
- Small, lightweight, easy-to-install units.
- Lifting provisions on units over 85 pounds Non-PCB components
- Isolated wiring compartments.
- Integral short circuit protection.
- Attractive exterior.
- Descriptive nameplate.

Typical applications

- Micro processors
- Computers
- Industrial process control
- X-Ray equipment (medical and industrial)
- Radar and sonar equipment
- Programmable controls
- DC power supplies
- Induction heating equipment
- Photographic equipment
- Air traffic control
- Communications systems
- Test equipment
- Numerical control
- Robotics

Type QSF, filtered output.

Harmonic filtered voltage stabilizers are recommended for use in systems designed for sine wave input, especially computers; and where electronic equipment is the primary load. The filter network of a Stabiltron I Type QSF voltage stabilizer reshapes the output wave form to a sinusoid, and limits the harmonic content to between three percent at full load and five percent at no load. All Type QSF, 60-hertz stabilizers are UL Listed and CSA Certified.

Type QSN, nonfiltered output.

Nonfiltered voltage stabilizers have a trapezoidal output wave form, containing approximately 26 percent odd harmonics.

Such a wave form can be desirable for rectifier circuits; and can also be used for non-inductive loads such as incandescent lighting. General Electric's Stabiltron I nonfiltered stabilizer is your most economical choice when used with properly designed rectifier, resistive, and other loads not sensitive to wave form.

Stabiliton Voltage Stabilizers

Ratings and data

Type QSF filtered output —	for CO UEDTA	ainala abasa - I		
Type USF Tillered Ollibul —	. for bu-meki/.	single-phase — i	ui iisteo ar	io CSA cerimeo i

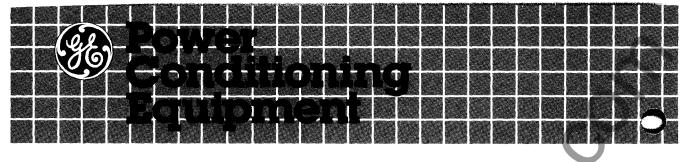
250	95-130 x 190-260	120/240	9T91B7141 ★	15	
250	95-130 x 175-235 x 190-260	120/240	9T91B7143	16	
250	190-260 x 380-520	120/240	9T91B7144 ★	15	
500	95-130 x 190-260	120/240	9T91B7151 ₩	15	
500	95-130 x 175-235 x 190-260	120/240	9T91B7153 ₩	16	
500	190-260 x 380-520	120/240	9T91B7154 ₩	15	
1000	95-130 x 175-235 x 190-260	120/240	9T91B7173 🐺	16)	
1000	190-260 x 380-520	120/240	9T91B7174 🙊	15 A	
2000	95-130 x 175-235 x 190-260	120/240	9T91B7183 ★	16	1 <u>2</u>
2000	190-260 x 380-520	120/240	9T91B7184	15	1 <u>2</u>
3000	95-130 x 175-235 x 190-260	120/240	9T91B7193 🐺	16	12
3000	190-260 x 380-520	120/240	9T91B7194 🛣	15	12
5000	95-130 x 175-235 x 190-260	120/240	9T91B7203 💥	16	12
5000	190-260 x 380-520	120/240	9T91B7204 🙀	15	12
7500	175-235 x 190-260 x 380-520	120/240	9T91B7216 🗷	17	13
10000	175-235 x 190-260 x 380-520	120/240	9T91B7226 🕸	17	18
15000	175-235 x 190-260 x 380-520	120/240	9T91B7246 🛎	17	18

Type QSF, filtered output — for 50-HERTZ, single-phase

250	95-130 x 175-235 x 190-260	120/240	9T91B7148	16	11
500	95-130 x 175-235 x 190-260	120/240	9T91B7158	16	11
1000	95-130 x 175-235 x 190-260 👞	120/240	9T91B7178 🛣	16	1
2000	95-130 x 175-235 x 190-260	120/240	9T91B7188	16	12
3000	95-130 x 175-235 x 190-260	120/240	9T91B7198	16	12
5000	95-130 x 175-235 x 190-260	120/240	9T91B7208	16	12
7500	175-235 × 190-260 × 380-520	120/240	9T91B7219	17	13

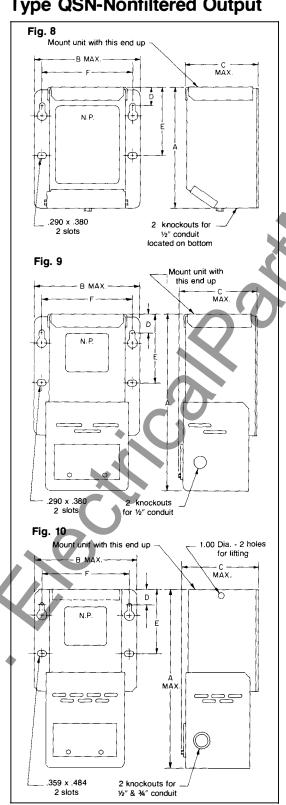
Type QSN, nonfiltered output — for 60-HERTZ, single-phase

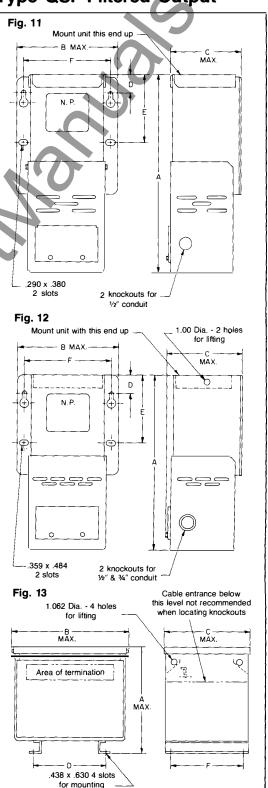
30	95-130	120	9T91B4090 🕱	14	8
60	95 130	120	9T91B4110 🛣 📗	14	8 8
120	95-130	120	9T91B4130 🛣	14	8
250	95-130 x 190-260	120/240	9T91B4141	15	9
250	190-260 x 380-520	120/240	9T91B4144	15	9
500	95-130 x 190-260	120/240	9T91B4151 ★	15	9
500	190-260 x 380-520	120/240	9T91B4154	15	9
1000	95-130 × 190-260•	120/240	9T91B4171 🛣	15	9
1000	190-260 × 380-520	120/240	9T91B4174	15	9
2000	95-130 ₁ x 175-235 x 190-260	120/240	9T91B4183 ₩	16	10
2000	190-260 x 380-520	120/240	9T91B4184	15	10
3000	95-130 x 175-235 x 190-260	120/240	9T91B4193	16	10
3000	190-260 x 380-520	120/240	9T91B4194	15	10
5000	95-130 × 175-235 × 190-260	120/240	9T91B4203	16	10
5000	190-260 x 380-520	120/240	9T91B4204	15	10



Dimensions and weights

Type QSN-Nonfiltered Output Type QSF-Filtered Output





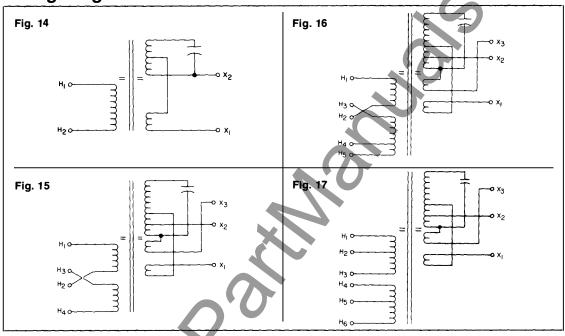
Stabiliton i Voltage Stabiliters

9T91B4090	30	60		Χ	8	63/8	5½	31⁄4	11/8	41/8	41/8	(4)1/4	6
9T91B4110	60	60		X	8	73/8	61⁄a	41/4	11/8	41/8	51/8	(4)1/4	10
9T91B4130	120	60		Х	8	73/8	61/s	41/4	11/8	41/8	51⁄8∢	(4)1/4	15
9T91B4141 9T91B4144	250	60	*	X	9	121/2	7%	5%	2	6	67/8	(4)1/4	28
9T91B7141 9T91B7143 9T91B7144	250	60	х		11	151⁄4	7%	55/8	2	6	67⁄8	(4)1/4	37
9T91B7148	250	50	X		11	151/4	7%	5%	2	6	6%	(4)1/4	37
9T91B4151 9T91B4154	500	60		Х	9	12½	7%	55/8	2	6	6%	(4)1/4	37
9T91B7151 9T91B7153 9T91B7154	500	60	X		11	15%	9%	67/8	2	8	8%	(4)1/4	57
9T91B7158	500	50	Х		11	15%	93/8	6%	2	8	83/8	(4)1/4	57
9T91B4171 9T91B4174	1000	60		×	9	14%	93/8	63/4	2	6	83/8	(4)1/4	60
9T91B7173 9T91B7174	1000	60	х		11	201/8	93/8	63/4	2	8	8%	(4)1/4	78
9T91B7178	1000	50	X		11	201/8	9%	6¾	2	8	83/8	(4)1/4	85
9T91B4183 9T91B4184	2000	60		Х	10	181⁄4	123/8	93/4	3	8	111/4	(4) ⁵ / ₁₆	110
9T91B7183 9T91B7184	2000	60	X		12	25%	12%	93/4	3	12	111/4	(4) ⁵ / ₁₆	172
9T91B7188	2000	50	X		12	25%	123/8	9¾	3	12	111/4	(4) ⁵ / ₁₆	180
9T91B4193 9T91B4194	3000	60		×	10	21¼	12%	9¾	3	10	111/4	(4) ^{5/} 16	170
9T91B7193 9T91B7194	3000	60	Х		12	32%	12¾	9¾	3	16	111/4	(4) ⁵ / ₁₆	237
9T91B7198	3000	50	X		12	32%	12%	9¾	3	16	111/4	(4) ⁵ /16	245
9T91B4203 9T91B4204	5000	60		х	10	26¾	15%	12	3	13	14	(4)3/8	275
9T91B7203 9T91B7204	5000	60	×		12	37%	15%	12	3	18	14	(4)¾	368
9T91B7208	5000	50	X		12	371/8	155/8	12	3	18	14	(4)%	380
9T91B7216	7500	60	X		13	29%	31¾	23	223/4		22	(4)%	602
9T91B7219	7500	50	X		13	29¾	31¾	23	22¾	_	22	(4)3/8	615
9T91B7226		60	X		13	29%	31¾	23	22¾		22	(4)3/8	727
9T91B7246	15000	60	X		13	29¾	381/2	23	291/2		22	(4)3/8	925

Stabiliron I ... Voltage Stabilizers

Wiring diagrams and connections

Wiring Diagrams



Standard Connections

Stariua	ra Con	IECTION	5							
	For 95-130 volt rated units									
	14	95-130	H1 & H2	No internal connection necessary						
	For 95-130 or 190-260 volt rated units									
	15	95-130 190-260	H1 & H4 H1 & H4	H1 to H3 and H2 to H4 H2 to H3						
Input	For 190-260 or 380-520 volt rated units									
	1 45 AT	190-260 380-520	H1 & H4 H1 & H4	H1 to H3 and H2 to H4 H2 to H3						
	For 95-130, 175-235 or 190-260 volt rated units									
	16 16	95-130 175-235 190-260	H1 & H5 H1 & H4 H1 & H5	H1 to H3 and H2 to H5; insulate H4, and let it float H2 to H3; insulate H5, and let it float H2 to H3; insulate H4, and let it float						
	For 175-235, 190-260 or 380-520 volt rated units									
V		175-235 190-260 380-520	H1 & H5 H1 & H6 H1 & H6	H1 to H4 and H2 to H5; insulate H3 and H6, and let them floa H1 to H4 and H3 to H6; insulate H2 and H5, and let them floa H3 to H4; insulate H2 and H5, and let them float						
	For 120 v	olt rated	units							
Output	14	120	X1 and X2							
•	For 120/2	40 voit ra	ated units	(either 2- or 3-wire loads)						
	15,16or17 15,16or17 15,16or17	120 120 240	X2 and X3	(for nameplate kva); insulate X3, and let it float (for ½ nameplate kva); insulate X1, and let it float (for nameplate kva); insulate X2, and let it float						

Line **Conditioners**



...superb noise suppression and precise voltage stabilization

Varying steady-state voltages and power lines with electrical noise problems pose difficulties for today's electrical and electronic equipment. Most of the varying voltages are caused by changes of loads which occur at different times of the day. But sometimes planned, temporary voltage reductions are made by utility companies. These are known as "brownouts". With General Electric line conditioners, you can control these difficulties and contribute to more reliable equipment operation and reduced downtime

Available as portable or hardwired units, GE line conditioners will stabilize voltage, suppress electrical noise and act as surge suppressors against lightning discharges. They assure output voltage of $\pm 2\%$ of the rated output even when supply voltage varies as much as $\pm 15\%$.

Line conditioner features

- UL Listed and CSA Certified for safety assurance.
- Immediate correction to voltage changes (within two cycles for dependability).
- Brownout protection.
- 120 db common mode noise rejection.

- 60 db transverse mode noise rejection.
- Precise ($\pm 2\%$) voltage regulation.
- Operate in -25°C to +40°C ambients.
- Maintenance-free, no moving parts.
- Low audible noise for quiet operation.

Portable models:

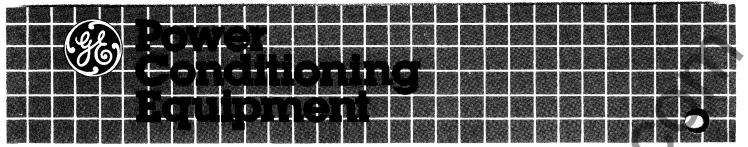
- Sturdy aluminum construction which is lightweight and strong for long life.
- Modern, two-tone units which blend with office or home decor.

Hardwired models:

- Steel construction for industrial and commercial applications.
- Well marked leads and spacious wiring compartment for easy hookup by electrical personnel.
- Audible noise level below industry requirements.

Typical applications

- Robotics
- Computers
- Electronic cash registers
- Microprocessors
- Programmable controllers •
- Mini-computers
- Numerical controls
- Word processors
- Data terminals
- Business machines
- Voltage sensitive devices
- X-ray machines
- Security systems
- Test instruments
- Point-of-sale terminals
- Hospital monitoring devices
- Home electronic equipment
- Other sensitive electronic equipment



Ratings and data 60 Hz, Single-phase

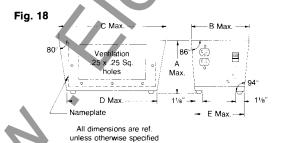
realty	lapur. Yolkige	Nominal Quiput	Pypical Audible			Dimension
KVA Line Line	Parse	Voltage	Noke hya	Rodel Number	Plagram Fig. We.	A Weight Flants.
ortable mo	dels 95-130	120	36	9T91L0130G3	22	18
.250	95-130	120	36	1 9191LU14U 🛣	22	18
.250 .500	95-130 95-130	120 120	39	9T91L0140 ★ 9T91L0150 ★	22	18

Hardwired models

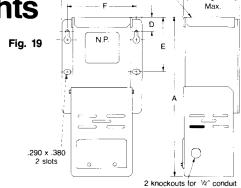
.250	95-130x175-235x190-260	120/240	736-1	9T91L1143 ₩	24	19
.250	475-650	120/240	36	9T91L1145	26	19
.500	95-130x175-235x190-260	120/240	40	9T91L1153 🐺	24	19
.500	475-650	120/240	40	9T91L1155	26	19
.750	95-130x175-235x190-260	120/240	40	9T91L1163 💥 📗	24	19
.750	475-650	120/240	40	9T91L1165	26	. 19
1.00	95-130x175-235x190-260	120/240	40	9T91L1173 🔻	24	19
1.00	475-650	120/240	40	9T91L1175	26	19
2.00	95-130x175-235x190-260	120/240	42	9T91L1183 🕸 📗	24	20
2.00	475-650	120/240	42	9T91L1185	26	20
3.00	95-130x175-235x190-260	120/240	45	9T91L1193 🕸	24	20
3.00	475-650	120/240	45	9T91L1195	26	20
5.00	95-130x175-235x190-260	120/240	47	9T91L1203 🔻	24	20
5.00	190-260x380-520	120/240	47	9T91L1204 🕸	23	20
5.00	475-650	120/240	47	9T91L1205	26	20
7.50	95-130x175-235x190-260	120/240	52	9T91L2213 🛣	24	21
7.50	190-260x380-520	120/240	52	9T91L2214 🐺	23	21
10.00	175-235x190-260x380-520	120/240	55	9T91L2226 🐺	25	21
5.00	175-235x190-260x380-520	120/240	60	9T91L2246 🕏	25	21

Contact factory for additional information including three-phase applications and other features not shown.

Dimensions and weights



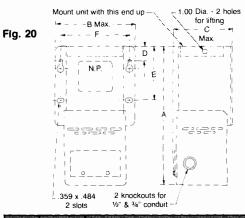
			Appro	ng Ryy Cayan Wisih	Imemálor 1705 1705 1705 1705 1705 1705 1705 1705	0	100 E3 ⁽⁴⁾	O DE CONTROL OF CONTRO
	.150	23	73/4	73/4	161/4	14	7	NA
I	.250	25	73/4	73/4	161/4	14	7	NA
i	.500	38	91/2	91/2	18¾	15¾	8 ⁷ /16	NA
ı	.750	51	91/2	91/2	18¾	15¾	87/16	NA
	1 00	60	01/6	Q1/a	183/4	153/4	87/10	ΙΝΔ

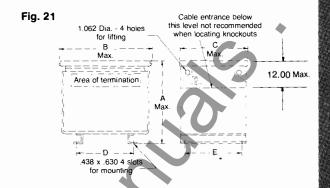


Mount unit this end up

rikor (AU W		eximites Const Tyranita	Allina in a second seco		100		Mera Sanchy Select Sanchy
.250	37	151/4	71/8	55/8	2	6	67/8	4(1/4)
.500	57	15%	93/8	6¾	2	8	8%	4(1/4)
.750	62	201/8	9%	6¾	2	8	83/8	4(1/4)
1.00	78	201/8	9%	63/4	2	8	83/8	4(1/4)

Normally in factory stock.

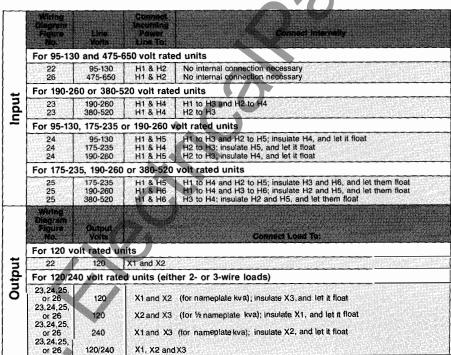


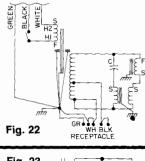


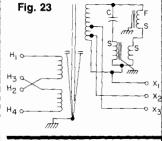
								F	
1	2.00	172	25%	123/8	93/4	3	12	111/4	4(5/16)
1	3.00	237	323/8	12%	93/4	3	16	111/4	4(5/16)
Ì	5.00	368	371/в	15⅓	12	3	18	14	4/3/8)

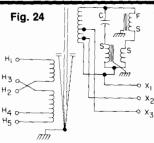
7.50	602	29¾	313/4	23	22¾	20%	4(3/8)
10.00	727	29¾	31¾	23	223/4	20⅓	4(%)
15.00	925	29¾	381/2	23	291/2	20%	4(3/8)

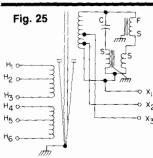
Standard connections and wiring diagrams













Guard I[™] and Guard II[™] Noise Isolation Transformers



Guard I™ Noise Isolation Transformer

...extra protection

The General Electric noise isolation transformer is a two-winding unit with an electrostatic shield. It acts to prevent high-frequency signals between the supply lines and ground from reaching your sensitive electronic equipment.

Guard I[™] Noise Isolation

Guard I noise isolation transformers will protect electronic equipment from problems associated with electrical noise. With an excellent common-mode noise attenuation of 120 db and a transverse-mode noise attenuation of 30 db, the Guard I units are designed for use in a wide range of applications. Their ANSI 61 gray general purpose enclosures are suitable for most commercial and industrial applications.

Guard II Noise Isolation

Guard II noise isolation transformers offer the ultimate in line noise and spike/surge protection for sensitive equipment. Additional noise and spike/surge suppression components, in combination with the electrostatic shield, provide an excellent transverse mode noise attenuation of 60 db. This in conjunction with a common mode noise attenuation of 120 db insures protection from line noise, spikes, and surges. Guard II noise isolation transformers are furnished in an attractive brown and beige enclosure intended for use in computer room and office environments.

Features

- Single- and three-phase ratings.
- Compliance with ANSI & NEMA standards.
- Sound levels below ANSI limits.



Guard II™ Noise Isolation Transformer

- UL listed.
- 120 db common mode noise rejection. (Guard I & II)
- 60 db transverse mode noise rejection (Guard II)
- 30 db transverse mode noise réjection (Guard I)
- Large three-phase ratings which can be modified for outdoor installation.

Typical applications

- Computer installations
- Process controllers
- Hospital operating rooms
- X-ray rooms
- Diathermy rooms
- Electrical laboratories
- Excellent isolation of secondary circuit from primary circuit

Electrostatic shield

The electrostatic shield consists of a one-turn strip-copper winding placed between the transformer primary winding and secondary winding. To prevent shorting of the one-turn shield, the ends are adequately insulated. A lead from one end of the shield is run to the transformer enclosure for grounding. An electrostatic shield does not change the primary and secondary winding insulation level to ground.

General Electric Guard I noise isolation transformers, with an electrostatic shield, do an excellent job of attenuating common mode noise and a fair job of attenuating transverse mode noise. With additional spike/surge and noise suppression components, General Electric Guard II noise isolation transformers offer increased levels of protection including excellent transverse mode noise attenuation.

Ratings and data - Guard I™ Noise Isolation Transformers

Single-phase

	120 x 240 Volts Primary Secondary 120/240 Volts			208 Volts Primary Secondary 120/240 Volts			277 Volts Primary Secondary 120/240 Volts			240 x 480 Voits Primary Secondary 120/240 Voits							
KVA	Model No.		* Taps	Wiring Diagram No. (Pg. 19)	& Wgts.		* Taps		† Dim. & Wgts. Fig. No.		Taps	Wiring Diagram No. (Pg. 19)	& Wgts.	Model No.	* Taps	Wiring Diagram No. (Pg. 19)	& Wgts.
5	9T51B28G3		N	42	30	9T51B158G3	N	43	30	9T51B188G3	2	44	30	9T51B8G3 🚜	N	42	30
/5	9T51B29G3	ı	N	42	31	9T51B159G3	N	43	31	9T51B189G3	2	44	31	9T51B9G3	l N	42	31
***1	9T51B30G3	ı,	N	42	31	9T51B160G3	N	43	31	9T51B190G3	2	44	31	9T51B10G3 🛊	N	42	31
2	9T51B32G3	ď,	N	42	32	9T51B156G3	N	43	32	9T51B192G3	2	44	32	9T51B12G3	l N	42	32
3	9T51B33G3		N	42	33	9T51B157G3	N	43	33	9T51B193G3	2	44	33	9T51B13G3	N	42	33
5	9T21B1001G4	ı	N	42	34	9T21B1028G4	N	43	34	9T21B1046G4	2	44	34	9T21B1004G4	N	42	34
7.5	9T21B1002G4		N	42	35	9T21B1029G4	N	43	35	9T21B1047G4	2	44	35	9T21B1005G4	l N	42	35
10	9T21B1003G4	ı	N	42	36	9T21B1030G4	l N	43	36	9T21B1048G4	2	44	36	9T21B1006G4	N	42	36
15	9T21B9101G3		N	42	37	9T21B9119G3	N	43	37	9T21B9143G3	2	44	37	9T21B9103G3	N	42	37
25	9T21B9102G3	ı	N	42	38	9T21B9120G3	lΝ	43	38	9T21B9144G3	2	44		9T21B9104G3		42	38

Three-phase

	480 V Secondar	olts Pri y 208Y/			480 \ Secondai	olts Pri			208 Volts Primary Secondary 208Y/120 Volts			
KVA	Model No.	* Taps	Wiring Diagram No. (Pg. 19)	† Dim. & Wgts. Fig. No.	Model No.	* Taps	Wiring Diagram No. (Pg. 19)	t Dim. & Wgts. Fig. No.	Model No.	* Taps	Wiring Diagram No. (Pg. 19)	† Dim. & Wgts. Fig. No.
9	9T21A4009G3	4	45	39	9T21B3105G3	4	45	39	9T21B3122G3	4	45	39
15	9T23B3871G3	l 6	47	41	9T23B3851G3	6	47	41	9T23B3091G3	6	48B	41
30	9T23B3872G3	В	46	40	9T23B3852G3	6	46	40	9T23B3092G3	6	48A	40
45	9T23B3873G3	6	46	40	9T23B3853G3	6 /	46	40	9T23B3093G3	6	48A	40
'5	9T23B3874G3	8	47	41	9T23B3854G3	6	47	41	9T23B3094G3	8	48B	41
12.5	9T23B3875G3	6	47	41	9T23B3855G3	₩6	47	41	9T23B3095G3	6	48B	41
150	9T23B3876G3	l 6	47	41	9T23B3856G3	/ B	47	41	9T23B3096G3] 3	48	41
225	9T23B3877G3	6	47	41	9T23B3857G3	1 6	47	41	9T23B3097G3	3	48	41
300	9T23B3878G3	6	47	41	9T23B3858G3	1 6	47	41	9T23B3098G3	1 3	48	41
500	9T23B3879G3	6	47	41	9T23B3859G3	6	47	41	Contact Factory			

Guard II[™] Noise Isolation Transformers Three-phase

	480 Volts Primary Secondary 208Y/120 Volts								
KVA	Model No.	* Taps	Wiring Diagram No. (Pg. 19)	† Dim. & Wgts. Fig. No.					
15	9T23B3871G33	6	47	41					
30	9T23B3872G33	6	46	40					
45	9T23B3873G33	6	46	40					
75	9T23B3874G33	6	46	41					
112.5	9T23B3875G33	1 6	46	41					
150	9T23B3876G33	6	46	41					
225	9T23B3877G33	1 6	47	41					

		208 Volts Primary ondary 208Y/120 Volts							
KVA	Model No.	* Taps	Wiring Diagram No. (Pg. 19)	† Dim. & Wgts. Fig. No.					
9	9T21B3122G33	4	45	39					
15	9T23B3091G33	6	48B	41					
30.	9T23B3092G33	6	48A	40					
45	9T23B3093G33	1.6	48A	40					
75	9T23B3094G33	6	48B	41					
112.5	9T23B3095G33	6	48B	41					
150	9T23B3096G33	3	48	41					
225	9T23B3097G33	3	48	41					
300	9T23B3098G33	l 3	48	41					
500	Contact Factory								

Notes: Guard I, Guard II

Consult factory for ratings not shown
* Tap Arrangements:

N — No taps.

2 — (2) 5% taps below rated primary.

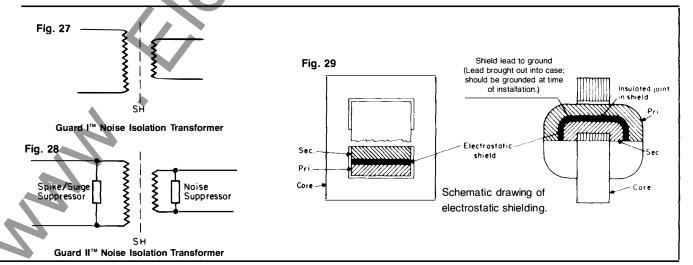
3 — (3) 5% taps 1 above and 2 below rated primary.

4 — (4) 2½% taps 2 above and 2 below rated primary.

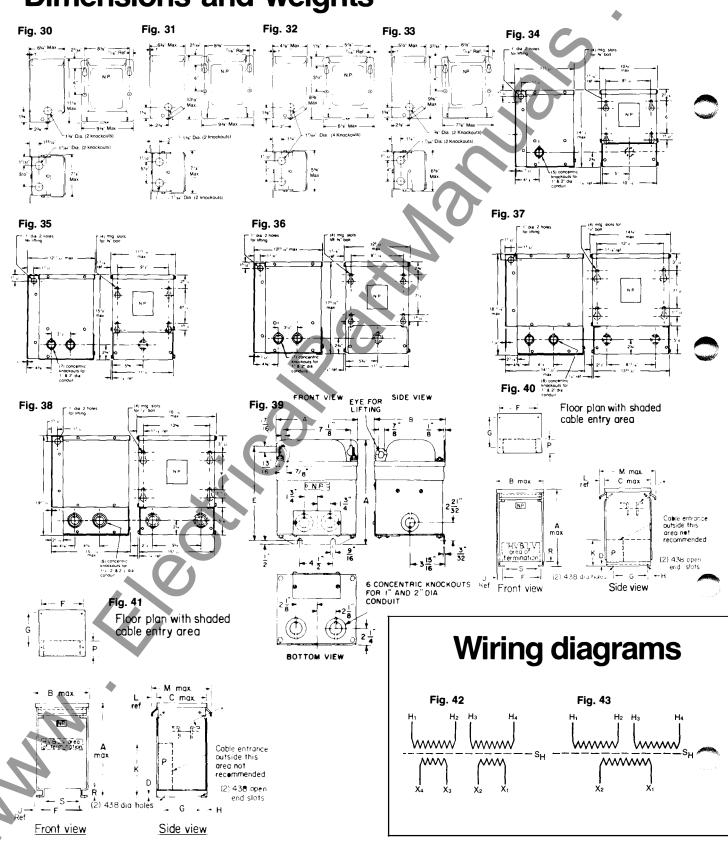
— (6) 2½% taps 2 above and 4 below rated primary.

Normally in factory stock

† For dimensions and weights, see pages 18 and 19.

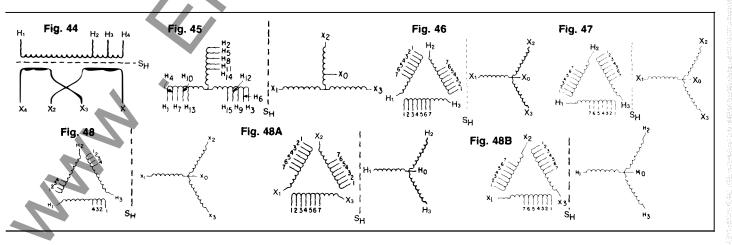


Dimensions and weights



Kva	Model Number	Approx. Net Wt. in Lbs.	Fig. No.
ngle-phase, 0.	5 - 25 KVA		
0.5	9T51B8G3, -28G3, -158G3, -188G3	16	30
0.75	9T51B9G3, -29G3, -159G3, -189G3	25	31
1	9T51B10G3, -30G3, -160G3, -190G3	25	31
2	9T51B12G3, -32G3, -156G3, -192G3	40	32
3	9T51B13G3, -33G3, -157G3, -193G3	60	33
5	9T21B1001G4, -1004G4, -1028G4; -1046G4	82	34
7.5	9T21B1002G4, -1005G4, -1029G4, -1047G4	104	35
10	9T21B1003G4, -1006G4, -1030G4, -1048G4		36
15	9T21B9101G3, -9103G3, -9119G3, -9143G3	215	37
25	9T21B9102G3, -9104G3, -9120G3, -9144G3	325	38

		Fig.				Appro	oximate D	dimension	ns in Inc	hes					Approx
Kva	Model Number	No.	A Max. Height	B Max. Width	C Max. Depth	۵	F	G	н	J	К	Р	R	s	Approx Net Wt in Lbs.
Three	-phase, 9 - 50	00 K	VA							7			1		-
9	9T21B3105G3 9T21B3122G3 9T21A4009G3	39 39 39	281 /16 28 ¹⁵ /16 28 ¹⁵ /16	91/s 91/s 91/s	7% 7% 7% 7%										153 153 153
15	9T23B3091G3 9T23B3851G3 9T23B3871G3	41 41 41	24¼ 24¼ 24¼	19 19 19	16¼ 16¼ 16¼	3/32 3/32 3/32	16 16 16	143/8 143/8 143/8	5/8 5/8 5/8	1½ 1½ 1½ 1½	14 14 14	41/8 41/8 41/8	2¾ 2¾ 2¾	17½ 17½ 17½	125 125 125
30	9T23B3092G3 9T23B3852G3 9T23B3872G3 9T23B3872G33	40 40 40 40	31¼ 31¼ 31¼ 31¼	24 24 24 24 24	16¼ 16¼ 16¼ 16¼	1/8 1/8 1/8 1/8	20½ 20½ 20½ 20½ 20½	14 14 14 14	1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆	13/4 13/4 13/4 13/4	1014 1014 1014 1014	4% 4% 4% 4% 4%	3% 3% 3% 3% 3%	17½ 17½ 17½ 17½ 17½	280 280 280 300
45	9T23B3093G3 9T23B3853G3 9T23B3873G3 9T23B3873G33	40 40 40 40	3274 3274 3274 3274	24 24 24 24 24	17% 17% 17% 17%	1/8 1/8 1/8 1/8	201/2 201/2 201/2 201/2	15½ 15½ 15½ 15½ 15½	1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆	134 134 134 134	111/4 111/4 111/4 111/4	4% 4% 4% 4% 4%	3% 3% 3% 3% 3%	17½ 17½ 17½ 17½ 17½	365 365 365 395
75	9T23B3094G3 9T23B3854G3 9T23B3874G3 9T23B3874G33	41 41 41 41	35¾ 35¾ 35¾ 35¾	32 32 32 32 32	23¾ 23¾ 23¾ 23¾ 23¾	3/16 3/16 3/16 3/16	28½ 28½ 28½ 28½ 28½	19½ 19½ 19½ 19½	1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆	134 134 134 134	19 19 19 19	6 6 6	3 3 3 3	23% 23% 23% 23%	465 465 465 515
112.5	9T23B3095G3 9T23B3855G3 9T23B3875G3 9T23B3875G33	41 41 41 41	40 40 40 40	32 32 32 32	23¾ 23¾ 23¾ 23¾	3/16 3/16 3/16 3/16 3/16	28½ 28½ 28½ 28½ 28½	19½ 19½ 19½ 19½ 19½	1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆	13/4 13/4 13/4 13/4	19 19 19 19	6 6 6	3 3 3	23% 23% 23% 23%	605 605 605 675
150	9T23B3096G3 9T23B3856G3 9T23B3876G3 9T23B3876G33	41 41 41 41	46 46 46 46	35 35 35 35	23¾ 23¾ 23¾ 23¾ 23¾	^{3/16} ^{3/16} ^{3/16} ^{3/16}	30 30 30 30	21 21 21 21 21	1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆	13/4 13/4 13/4 13/4	20 20 20 20 20	6 6 6 6	3 3 3 3	26% 26% 26% 26% 26%	775 775 775 865
225	9T23B3097G3 9T23B3857G3 9T23B3877G3	41 41 41	48 48 48	38½ 38½ 38½	29 29 29	3/ ₁₆ 3/ ₁₆ 3/ ₁₆	35 35 35	22 ⁹ / ₁₆ 22 ⁹ / ₁₆ 22 ⁹ / ₁₆	1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆	2½ 2½ 2½ 2½	21 21 21	6 6 6	3 3 3	29% 29% 29%	1030 1030 1030
300	9T23B3098G3 9T23B3858G3 9T23B3878G3	40 40 40	513/4 513/4 513/4	42½ 42½ 42½	301/4 301/4 301/4	3/16 3/16 3/16	37½ 37½ 37½	27 ⁹ /16 27 ⁹ /16 27 ⁹ /16	1 ³ / ₁₆ 1 ³ / ₁₆ 1 ³ / ₁₆	2½ 2½ 2½	21 21 21	8 8 8	3% 3% 3%	34% 34% 34%	1320 1320 1320
500	9T23B3859G3 9T23B3879G3	40 40	58¾ 58¾	. 47½ 47½	32½ 32½	^{3/16} ^{3/16}	42½ 42½	30 ¹ / ₁₆ 30 ¹ / ₁₆	11/4 11/4	2½ 2½	25 25	11 11	3% 3%	39% 39%	1850 1850

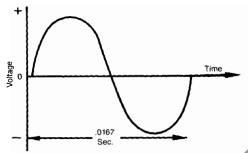




Application and Background Information For Power Conditioning Equipment

An ideally "clean" power source offers a continuously smooth alternating voltage in a sinusoidal shape as shown in Figure 49.

Fig. 49



An ideal sinusoidal voltage source

When a power source voltage is described as being "dirty," it will contain one or more of the following elements and characteristics:

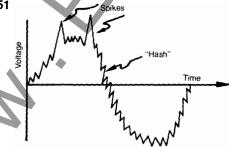
- Electrical noise Figures 50 and 51
- Voltage spikes and surges — Figure 51
- Circuit voltage interruption Figure 52
- Voltage fluctuations (rises and dips) — Figure 53

Fig. 50

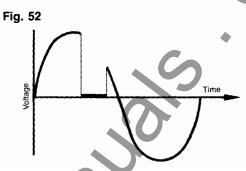


Shown here a voltage wave which has been distorted by the odd harmonic frequencies.

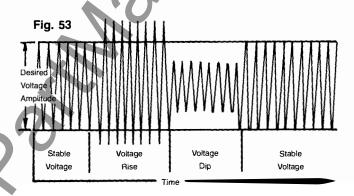
Fig. 51



Electrical noise shown as both "hash" and voltage spikes. (Voltage spikes are known to cause permanent damage to sensitive electronic equipment.)



An approximate 1/s cycle interruption of the voltage source may cause a malfunction of electronic components.



Rapid voltage level changes can cause erroneous output or complete shutdown of electronic equipment.

All of the "dirty" power source problems illustrated in Figures 50 through 53 can be corrected by General Electric's power conditioning equipment.

Electrical Noise

Electrical noise is comprised of unwanted signals conducted by metallic conductors. These unwanted signals and voltage spikes appear in two forms: common mode and transverse mode.

Common mode:

Noise that occurs between the ground plane and either the metallic hot line or metallic neutral conductor.

Transverse mode:

Noise that occurs from spurious signals across the metallic hot line and the metallic neutral conductor.

Typical sources of these two types of noise include: poor ground connection, lightning discharges, elevator equipment, ignition systems, poor motor brush contacts, SCR's firing, opening & closing of contactors, welders, ignitors, switching power supplies and circuit switching.

Application internation Operation Characteristics

Dedicated feeders

Local power companies may assist with the reduction of electrical noise by supplying power over a dedicated distribution feeder serving buildings housing susceptible electronic equipment. These dedicated feeders, however, will be expensive and will conduct switching and lightning surges with which they come in contact.

Frequently, isolated and shielded dedicated circuits are installed from the main power panel inside a building to the areas where electronic equipment such as point of sale registers are located. These dedicated feeders may conduct electrical noise from adjacent circuits (through electromagnetic or electrostatic coupling), as well as transmit electrical noise that is on bus bars or conductors to which these dedicated feeders are metallically connected.

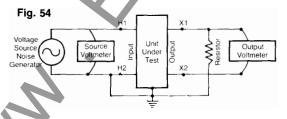
In the event of voltage fluctions, dedicated circuits offer no voltage stabilization to ensure reliable performance of electronic equipment.

Consequently, the substantial incremental investment for dedicated feeders, intended to transmit "clean" power, in many cases will be wasted.

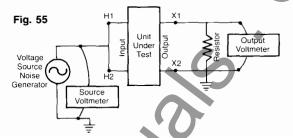
Other methods of noise suppression include: filters, surge suppressing MOV's and metallic shields. They may be installed separately from or located within the electronic equipment being protected. These devices and dedicated feeders do not, however, provide the protection to the high degree of reliability and consistency offered by high-quality power conditioning equipment.

Power Conditioning Equipment and Noise Rejection

Figures 54 and 55 are simplified circuits for testing the noise rejection capability of power conditioning equipment in regard to common and transverse mode types. Here, voltage from a noise generator (voltage source) is impressed on the input of the unit under test. At selected frequencies between 1 and 500 kilohertz, the input voltage is measured by the "source voltmeter" and compared to the output voltage measured by the "output voltmeter." The ideal device will cause the output voltage to be nearly zero.



Test circuit for transverse mode noise.



Test circuit for common mode noise.

Normally, noise rejection levels will be expressed in decibels (db). Referring to Figures 49 and 50, the db equation is:

db
noise rejection = 20 LOG₁₀

Using a numerical example:
Source voltage:
Output voltage:
50.00V
0.03V

noise rejection = $20 \text{ LOG}_{10} [50/0.03] = 64.4 \text{ db}$

Voltage Fluctuation

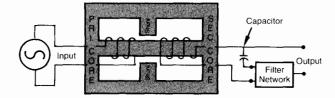
Electronic devices are designed to operate at a specific voltage which must be maintained at a relatively constant level. When the source voltage deviates from the specified level, loss of memory, erroneous data output, and even equipment shutdown may occur with electronic devices. Circuit faults, starting and stopping of motors, and the operation of ignition devices are some typical causes of up and down source voltage fluctuations that are corrected by the proper power conditioning equipment.

Whenever there is a change in the magnitude of the source voltage connected to an electronic device, a quick and almost instantaneous correction back to the correct specified voltage level must be made. This corrective action must occur usually within 1-2 cycles (.017 - .035 seconds).

Voltage regulating devices that use mechanical means to adjust output voltage are characteristically slow. Therefore, ferroresonant voltage stabilizers, since they are very fast responding devices, should be employed ahead of electronic components to maintain relatively constant voltage output.

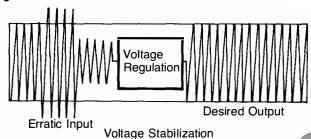
In a ferroresonant device, when the source voltage is lower than rated output voltage, a resonating action involving the capacitor and the series inductance (resulting from the shunt action) causes a voltage rise to the desired rated output. If the source voltage rises above this desired output level, the core on the secondary winding saturates. When saturation occurs, the additional flux in the primary passes through the shunt. Thus, the flux and voltage associated with the secondary winding remain at the relatively constant desired level. Figure 51 offers a simplified diagram of the components in a ferroresonant device.

Fig. 56



The GE line conditioner and voltage stabilizer are both ferroresonant voltage stabilizing devices and would offer voltage stabilization of erratic input voltage levels as shown in Figure 57. In the "Operating Characteristics Section," specific voltage response values are shown for these two products.

Fig. 57

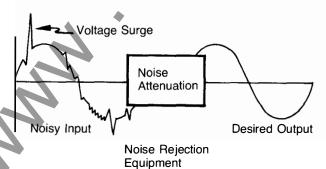


Surge Suppression

Power conditioning products must be capable of suppressing voltage surges and spikes below a level that would damage electronic components or cause these components to offer unreliable performance. The two primary sources of surges and spikes are: switching of power circuits and lightning discharges.

Inside the line conditioner and voltage stabilizer products filters of the type shown previously in Fig. 56 may be provided to suppress voltage surges. For the Guard I and Guard II noise isolation transformers a 1-turn metallic shield is provided for the surge and electrical noise suppression function. The Guard II units have additional surge and noise suppression components. Each of the power conditioning products offers different degrees of surge suppression expressed as attenuation ratios for both the common and transverse modes. This information is shown in the "Operating Characteristics Section" of this catalog. Shown in Figure 58 is a typical diagram of the expected surge suppression performance of a power conditioning product.

Fig. 58



Operating Characteristics Section

Characteristics/Comparisons Noise Suppression

Power conditioning products perform several functions: electrical noise rejection; voltage stabilization; surge suppression; circuit isolation. Although many electronic power equipments will reject transverse electrical noise up through approximately 1 KHZ, for frequencies above this range a power conditioning product will usually be needed for effective noise suppression.

Noise attenuation will vary according to the noise signal frequency. Shown in Figure 59 is a comparison of the typical noise attenuation performance for the General Electric power conditioning products at common noise signal frequencies. These typical noise attenuation db values were obtained from tests made on the circuits shown in Figures 54 & 55. Based on these test circuits, the noise attenuation performance of GE power conditioning products is among the highest in the industry.

Fig. 59

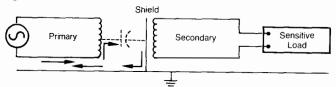
Typical Noise Rejection Performance

	Common Mode (IN DE)	Transverse Mode (N DB)
Line Conditioner	120	60
Stabiltron I	70	40
Guard I	120	30
Guard II	120	60

Noise Isolation Transformers

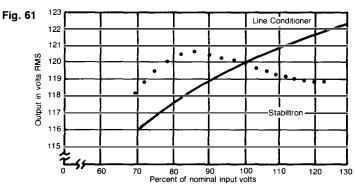
The noise isolation transformer suppresses common mode noise by introducing a grounded shield between its primary and secondary windings. (Fig. 60). The ground shield provides a low impedance path to ground which prevents unwanted high frequency signals contained in the source voltage from reaching the transformer secondary.

Fig. 60



Voltage Response

The nominal output voltage for the Stabiltron I and the line conditioner is designed to be 120V. Operating within a range of $\pm 15\%$ of input voltage variation, the output of the Stabiltron I will have a bandwidth no greater than $\pm 1\%$ of the 120V. The line conditioner will exhibit a bandwidth of no more than $\pm 2\%$ of the 120V. Figure 61 shows typical voltage bandwidth response curves for the Stabiltron I and the line conditioner when operated at rated full load current.



Typical voltage bandwidth response curves for Stabiltron I and line conditioner at full nameplate load.

When measuring output voltage, the tester should use a high-quality "true RMS reading" type voltmeter rather than an AC/DC voltmeter employing a rectifier with a DC movement. Peak- or average-sensing meters will give false readings on non filtered stabilizers. However, harmonic filtered Stabiltron I and line conditioner units may be measured with any reliable meter because the output wave form is sinusoidal.

Derating Stabilizers and Line Conditioners for a Wider Range of Input Voltages

By **oversizing** voltage stabilizers and line conditioners, one can achieve output voltage stabilization for a greater than ± 15% input voltage range. In Figure 62 the oversizing factor is indicated for several lower input voltage levels at which stable output voltage must be maintained. For voltage levels expected to be greater than 15% above the nominal rating, contact the factory.

Eia	62

Stabilization range table Selected nameplate kVA = [Oversizing Factor] x [kVA of load to be served]

Input Voltage (% above nominal Voltage)	Input Voltage (% below nominal Voltage)	Oversizing Factor
+15%	-15%	1.00
+15%	-20%	1.05
+15%	-30%	1.15
+15%	-40%	1.25
+15%	−50%	1.60
+15%	-60%	2.00
+15%	-70%	2.60

Typical

10

30

50

Impulse (Spike) Suppression Response

In addition to electrical noise suppression, the power conditioning products offer spike suppression capability expressed as an attenuation ratio (peak voltage of the spike to the resultant peak voltage at the output terminals of the power conditioning equipment). Typical attenuation ratios for the GE power conditioning products are shown in Figure 63.

transverse mode

common mode

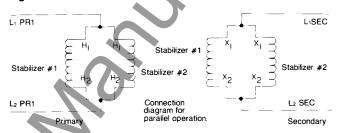
Fig. 63				Ratios	on
	7		No load connected to device	½ load connected to device	Full load connected to device
	Line Conditioner	transverse mode common mode	200 1000	250 2000	250 2000
1	Stabiltron I	transverse mode common mode	10 15	40 60	65 100
7	Guard I	transverse mode common mode	1 10	20 100	40 200

Guard II

Parallel Operation

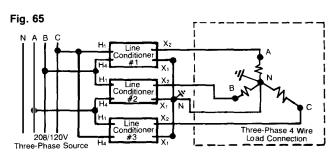
Voltage stabilizers or line conditioners of the same type, volt-amp capacity, voltage rating and frequency can be connected in parallel. This will increase the load capacity to the sum of the nameplate kVA's. Figure 64 is a connection diagram where two 10 kVA Stabilitron I stabilizers (Model No. 9T91B7226) are joined for parallel operation. The resulting output is 20 kVA.

Fig. 64



Three-phase Operation

Figure 65 is a typical connection diagram where single-phase stabilizers or line conditioners are banked in a delta connection to a three-phase source. They are serving the WYE connected load having a neutral that must be connected solidly to the neutral of the stabilizer or line conditioner neutral.



Three wire loads (Delta or WYE without neutral) should not be connected to points A, B, and C. Single-phase loads should not be connected phase to phase across: A to B, B to C, or C to A. Single-phase loads should be connected phase-to-neutral across: A to N, B to N, or C to N. The line to neutral loads (connected: A to N, B to N, and C to N) can be unbalanced. The recommended practice for grounding is to connect the neutral of the secondary connection and the neutral point of the load to a reliable ground point.

Noise Levels

GE voltage stabilizers and line conditioners have been designed to provide low acoustic noise levels. Figure 66 lists typical sound level values in decibels for voltage stabilizers and line conditioners.

Fig. 66

Decibel values of GE line conditioner and Stabiltron I when tested in accordance with IEEE Standard on Ferroresonant Regulators

	Line Conditioner and S Noise Level Readings VA Rating	Typical Decibels	
ı		No Load	Full Load
	Up to 1000VA	40	36
	2000 to 5000VA	50	45
	7500 to 15000VA	60	55

Short Circuit Current

GE line conditioners and voltage stabilizers feature the ability to limit the short circuit load current to approximately 180% of rated nameplate amperes. A short circuit on the output load can exist indefinitely without damage to the line conditioners or stabilizers.

Fig. 67

Overload Characteristics (Line Conditioner and Voltage Stabilizer)

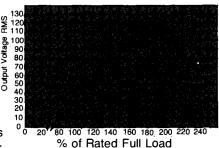


Figure 67 illustrates the typical voltage response of the GE ferroresonant regulator as a function of overloads. If a ferroreson-

Output voltage response for overloads for line conditioner & voltage stabilizer

ant device is overloaded to the extent that the output voltage collapses, the output voltage will return to a normal value when the overload or short circuit is removed from the secondary terminals of the line conditioner or voltage stabilizer.

Ambient temperature

All General Electric standard voltage stabilizers are designed for continuous operation within -25° C to 40° C ambient temperature range. The output voltage level will change approximately .03% per degree C for changes in ambient temperature within the rated range.

Case Operating Temperature - Voltage Stabilizer and Line Conditioner

All line conditioners and voltage stabilizers shown in this brochure are approved and listed by Underwriters' Laboratories under Standard 1012 for Power Supplies. Under this UL Listing, the manufacturer is required to maintain at full load case temperature of no more than 65°C rise above a 40°C ambient.

Response Time

GE voltage stabilizers and line conditioners provide almost instantaneous response to line and load changes since corrective action is accomplished electrically rather than mechanically. For most changes in input voltage to the ferroresonant device, the output voltage will normally be returned to its original level within three cycles. Within two cycles after an input voltage excursion, the ferroresonant regulator will have offset at least 63% of the value of the maximum excursion. These same statements generally apply for abrupt changes in the load (within the rated load range) connected to the output terminals of line conditioners and voltage stabilizer.

Motor Loads

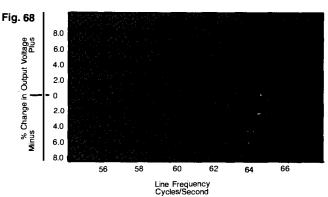
(Line Conditioner and Voltage Stabilizer)

General Electric line conditioners and voltage stabilizers are often used with motor loads. For this type of application, it is necessary to select a voltage stabilizer having an output current rating sufficient for locked-rotor condition of the motor. An alternate procedure, permitting the use of a lower rated voltage stabilizer and providing motor burnout protection, requires a motor starting switch that by-passes the voltage stabilizer until the motor reaches running speed.

Frequency

(Line Conditioner and Voltage Stabilizer)

In the continental United States, it is rare for power system frequency to vary appreciably from 60 hertz. However, in standby power systems and in foreign installations the effect of frequency changes on magnetic voltage stabilizers should be considered. Fig. 68 shows the effect of frequency on the output voltage of a 60 Hz rated device.



For more information, call or write your local General Electric Sales Office or

General Electric Company Construction Equipment Business Operation Specialty Transformer Operation P.O. Box 1701, Fort Wayne, IN 46801

Outside the U.S. and Canada, write: Export Sales and Trading, 570 Lexington Avenue, New York, NY 10022

