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Product Name:

GSR 2 Biofeedback System

Product #:

T2001M, T2120M

Device #:

SA2000B, SA2000M



- Type BF Equipment
- Internally powered equipment
- Continuous operation



- Read Instruction Manual

WARNING

- Do not use in the presence of a flammable anesthetic mixture with air or with Oxygenor Nitrous Oxide.
- Not to be immersed in water.

ATTENTION

- Radiated radio frequency electromagnetic fields may cause performance degradation in the GSR 2 unit.

CONTRAINDICATIONS

- None

INTENDED PURPOSE

- Biofeedback & Relaxation

NOTE

- The supplier will make available, upon request, circuit diagrams, component parts lists and description or other information required for the repair of product qualified personnel.

Manual #SA2035 Rev. 3

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Our age of stress

It is ironic that today, when technology and science have provided our society with so much, when so many of us eat better, live better, enjoy more leisure and comfort than any other people in history, we suffer from such widespread stress and tension.

Unless we live protected lives as virtual hermits on some island paradise, stress is very much with us - unfortunately for many, far too much. The dangers of excessive stress to our mental and physical health are well documented, the all-too-frequent answer being a reliance on alcohol or tranquilizing drugs. Fortunately, people are seeking new ways to cope, and are making everything from active sports to personal development programs, meditation and biofeedback training part of their everyday routines.

The ability to calm down and relax deeply is a powerful antidote to the effects of stress. The problem is that although all of us are born with this ability, it's something we often have to re-learn.

Body language

When you're under extreme stress, your body copes in ways that are very noticeable. Your heart pounds, your hands perspire, muscles tense up, extra adrenaline is released.

But not all stress is so extreme. Unfortunately, what really wears us down are lower levels of stress that occur constantly and that most of us accept as inevitable. Our bodies respond to this type of stress with much lower signals that mostly go unheeded. Now, biofeedback is enabling us to observe and modify these signals.

Biofeedback, explained

Biofeedback is an exciting field that combines physiology and psychology. The biofeedback technique uses electronics to detect and amplify internal body activities too subtle for normal awareness.

Once you are able to observe these activities, you can then try to modify them. Because you learn immediately whether you have succeeded or not, you can gradually teach yourself to produce the desired results.

Listen to your skin

One of the principal ways your body reacts to tension and stress is through your skin and what scientists call galvanic skin resistance.

This galvanic skin resistance, or GSR, is a reflection of variations in your sweat gland activity and pore size, both of which are controlled by the sympathetic nervous system. When you become excited, frightened or disturbed to any degree, the system activates chemical and physical changes all through your body. Your GSR level also changes.

Your skin resistance increases when you are calm and relaxed. When you tense up even slightly, your skin resistance decreases.

By letting you hear those increases and decreases, the GSR 2 monitor can give you a new awareness of the internal state of your mind and body, and help you develop the ability to control tension and stress.



Thoroughly modern GSR 2

Psychologists have been monitoring the electrical resistance



of the skin to gauge nervous system activity for over 100 years. The first instruments used featured an early-model electric meter called a galvanometer, after the 18th century Italian scientist, Luigi Galvani. He also gave his name to GSR.

By the 1950's, GSR machines were vastly improved, though still cumbersome and complicated by today's standards. They were available almost exclusively to medical practitioners and research personnel.

Next came the GSR 2's immediate ancestors: biofeedback instruments that were light, battery-powered and solid state, but still cumbersome. The GSR 2 is a great step forward.

Created and developed by clinical psychologists and engineers working in the field of stress reduction, the GSR 2 has done away with finger attachments. Its electrodes are an integral part of the case.

The GSR 2 is automatic. No switch needed to turn it on or off. It can be used just about anywhere.

Most important, the GSR 2 is so reliable, durable, affordable and simple to use, it has brought the benefits of biofeedback training within reach of virtually everyone.

Now in use around the world, the GSR 2 has been well accepted by leading medical, educational, athletic and social institutions.

How the GSR 2 works

To turn the unit on, place your fingers on the sensing plates. Turn the dial very slowly until you hear a tone. When you start to become calm and relaxed, your skin resistance increases and the tone lowers. When you become upset or agitated, your skin resistance decreases and the tone goes higher.

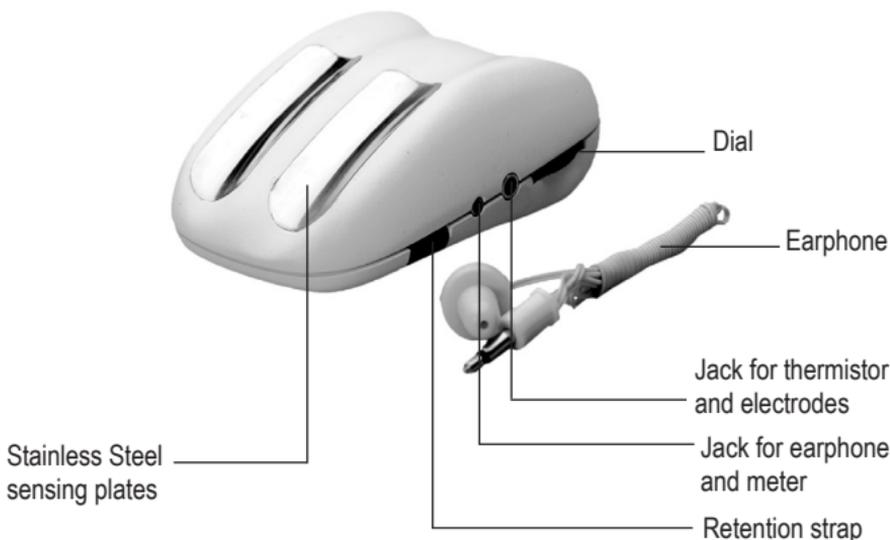
Put very simply, you learn to relax by learning how to diminish the tone of the GSR 2 to the lowest point possible. Read the instructions thoroughly and then you're ready to enjoy your first skin biofeedback experience.

The GSR 2 will shut off automatically as soon as you remove your fingers from the sensing plates.

Instructions

To get the most from your GSR 2, read the instructions before use. You will also find it helpful to listen to your cassette a few times.

1. Try to set aside the same relaxation time for yourself every day. How long you spend is up to you. Start with 10-20 minutes, or as long as you feel comfortable.



2. Find a quiet spot where you won't be interrupted or distracted. Average room temperature is best for operating the unit. Relax by loosening any tight clothing and removing your shoes.

3. Sit in a comfortable position at a desk, in an armchair or anywhere there is arm and elbow support. Lying down is not recommended unless your purpose is to fall asleep.

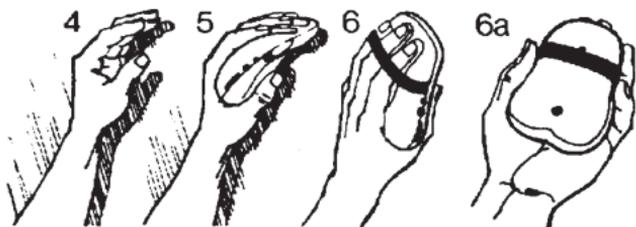
4. The GSR 2 can be used with either hand. However, using your left hand frees your thumb for easier dialing. To find the right position for your arm, let it rest naturally on its side, as if you were holding a glass (see illustration). The unit should rest easily in your hand.

5. Place your first two fingers limply on the sensing plates; your thumb goes underneath the unit. Never press down or squeeze. Only your natural touch is needed, as the unit is

designed to allow full and even contact, even if your fingers do not cover the complete length of the plates.

6. If your hand needs steadying, flip the strap up. The strap is not absolutely necessary, however, it is recommended that you use it. Use it only to stop hand movement and help you maintain a light, even pressure on the plates. To adjust band tightness, gently pull the band out on both sides. Many people prefer to allow the GSR 2 monitor to rest upside down in the palm of their hand. (See illustration 6a). Some people use the remote electrodes, described on page 21 of this manual, to permit stable monitoring even while moving their hand.

7. With your fingers in position, turn the dial all the way down (towards your wrist) with your thumb. Now slowly turn it back up until you hear a pleasant, low tone. If you turn the dial too far up, the tone will become too high-pitched for you to hear. Should that happen, simply turn the dial back slowly. Wait about 20 seconds for the tone to stabilize, then check once more to make sure you're at the low end of the tonal range. Once your tone level is established, leave it there.



8. Now you're ready to begin. With your hand in place and the tone set low, sit quietly with your eyes closed. Relax your muscles and breathe evenly. Let go of all distracting thoughts

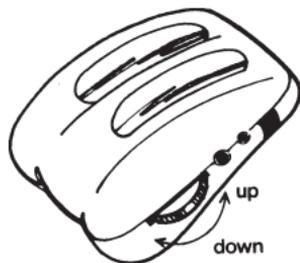
and allow your mind to clear. As you become more relaxed, the tone will gradually decrease. Don't expect instant results. Trying too hard can actually raise the tone.

There is usually about 2-5 seconds delay before your pores react, so don't expect instant tonal changes. Also, bear in mind that because you relax more slowly when you tense up, the tone will take longer to fall than to rise.

As you become more skillful at relaxing, the tone may diminish until you can't hear it. Just reset the dial slightly higher and continue as before. If the tone ever goes too high to hear, simply reset the dial to a lower starting point. The numbers on the dial are marked 1... to 9... You may like to note your setting before and after use.

With the GSR 2 tone at the same pitch, a higher number indicates relaxation. For example, if following your biofeedback session the dial reads 2, yet later when you reset the dial to produce the same pitch, it reads 3... it indicates a decrease in tension. It is meaningless to compare your setting with other people since each person's skin is as unique as his/her fingertips. Remember, your starting and finishing point is of little importance, rather it is the feeling of physical and mental relaxation which is the goal.

People who learn biofeedback control cannot always say how it is done. But be assured that before long, if you practice regularly, you will work out your own method. Don't be impatient. You have an important goal in mind: not only to bring the tone

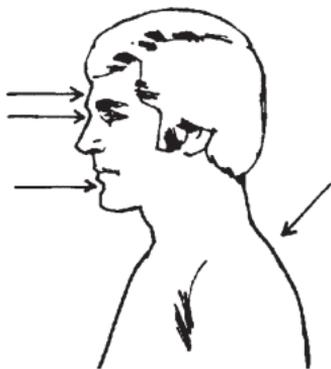


down, at will, as low as possible, but also to teach yourself to cope with stress through relaxation.

Three Simple Relaxation Exercises

The following exercises demonstrate how the GSR 2 instantly and continuously monitors your progress as your mental and physical states go from tense to relaxed.

NOTE: Throughout these exercises, try to maintain even, relaxed breathing. (This is well described in your relaxation tape recording.)



1) Basic Tension Relief

The arrows indicate three major stress points in you body. Set your GSR 2 at a low tone and try to encourage relaxation in these areas by doing the following:

1. Let your shoulders fall.
2. Let your jaw drop. As it does, your mouth will open slightly.
3. Relax the muscles around your eyes and forehead.

2) Muscle Relaxation

Instructions by Edmund Jacobson, MD

Prepare for a biofeedback session with the GSR2. Place it in a position that you can easily access, say near the right hand. Sit or lie down to use.

Before using the GSR 2:

1. Place both hands gently down on a flat surface, palms down.
2. Place the fingers of your right hand on top of the soft fleshy muscle mass just after the elbow bend on the top of the forearm.
3. Make a tight fist with the left hand. Notice the muscles under your right fingers tighten as you hold a tight fist. This is you making an **EFFORT** to hold a tight fist.
4. Loosen the tight left fist and notice the tight muscles under your right fingers go limp at the same time. That is you stopping the **EFFORT** of tightening the fist. Be sure that you are using your fist and not the muscles in your neck and shoulder.
5. Return both hands to the palm down starting position.

Using the GSR 2:

1. Place your right hand on the GSR 2 as if it were relaxed with your fingers under the finger band. Adjust the tone to a pleasant low pitch.
2. Again make a tight fist with your *left* hand for several seconds, just as you previously did. Be sure to breathe evenly and deeply during the entire session.
3. This time focus on the sensation in the left forearm, about at the same place that you had placed your *right* fingers to feel the muscles tense. There you will find the *sensation of you tensing* that we want you to learn to recognize everywhere in your body.

4. Let go of the tight left fist. Notice the *tensing sensation as it goes away*.
5. Again make a tight fist with the left hand. This time notice what happens to the tone of the GSR 2. If the tone increases, it indicates you have increased SNS arousal.
6. Gradually ease the tension in your left fist and arm. Notice the easing of the sensation of tension in the left forearm, and anywhere else in your body where you tensed in concert while tightening the fist. Notice, that in general, the tone of the GSR 2 will gradually decrease to a lower range as you yourself decrease your tension and experience a greater sense of relaxation.
7. Relax for a minute or two, and just observe the GSR 2's tone.
8. Again tighten the left fist, but this time only about one half as firmly as you did the first time. Again observe any increases in your GSR 2's tone. Notice the sensation of tenseness has returned to the same place just below your left elbow bend, but the sensation should be less distinct or intense.
9. Try to let the tightness in your fist and fingers go bit by bit, or step by step and see if you can notice the sensation of tenseness fading, step by step.
10. See if you can reach both a lower sensation of tenseness and GSR tone than when you started.

If you can learn to perceive your tension by recognizing the sensation of tension, then you are starting on your goal to learn progressive relaxation. To generalize your new ability to relax

to other parts of the body, try to find the sensation of tenseness, in other parts of your body and let go in the same stepwise manner.

3) Breathing Relaxation

1. Keep your hand relaxed on the GSR 2 and wait until the tone has stabilized in the low range.
2. Relax quietly with your eyes closed and focus on your breathing. Each time you inhale, fill your diaphragm by allowing your stomach to expand and letting this expansion roll up to your chest. (Refer to your recorded relaxation exercise if necessary.) Think of the tone as a clock ticking in the background as you focus your attention on your breathing.
3. Exhale slowly and completely, each time thinking the word “calm”, or any other word you would prefer to use. Stretch out the word so it becomes CAAAAALMMMM.
4. If thoughts arise or your attention wanders, simply focus on your breath when you realize what has happened.
5. This exercise may help you learn to let go of distracting or tension-producing thought patterns.

Two advanced visualization exercises

1. Visualization is a useful relaxation technique. When you have mastered the previous exercises, raise the tone of the GSR 2 to a higher starting level and teach yourself to lower it to your previous level. Visualize and experience in detail a pleasant situation. Observe its effects on the tone. Then visualize an unpleasant or stressful situation. If this raises

the tone, concentrate on bringing it down again by switching back to the pleasant scene.

2. This one is more difficult, but very rewarding if you master it. After you have succeeded in lowering the tone, visualize an anxiety-producing situation and try to maintain the low tone by countering your anxiety with relaxation. The purpose of this exercise is to encourage you to relax when confronted with a real, stressful situation.

Benefits of the GSR 2 in your everyday life

1. Once you are able to put yourself into a relaxed state, you have a valuable skill that you can apply to your everyday life. Your increased sensitivity to yourself will sharpen your awareness of how you respond to stressful situations, allowing you to remain calm, even without your unit.
2. Deep relaxation gives the mind and body a chance to recuperate. When your body is released from stress, you can enjoy increased energy.
3. The GSR 2 is often used in conjunction with personal development programs such as autogenic training, yoga and meditation. It acts as an internal guide, providing feedback on your state of focus and detachment, as well as on your improving skills.*
4. GSR biofeedback skills can be put to good use by sports participants. Athletes do better in tense situations if they can channel their excess nervous energy into performance and allow their natural abilities to surface unimpeded.*
5. Likewise, learning GSR biofeedback skills can be of great

benefit to students and people working in high-pressure jobs.

- * Breathing for Health™ (using Biofeedback program tapes and workbook to enhance breathing efficiency (T5725))
- * Mind Over Muscle™ (training program tapes and workbook for athletes (T2861))
- * Take Tests with Confidence™ (using Biofeedback program tapes and workbook for students (T5875))
- * Stress Control™ (with Biofeedback program tapes and workbook (T2869))
- * Public Speaking using Biofeedback™ (program tapes and workbook (T5825))

Upkeep of the GSR 2

The GSR 2 is made of high quality plastic and polished stainless steel. It is extremely durable, with no special care needed. However, as with any electronic instrument, it should not be handled abusively. To clean, wipe with a damp cloth and a little mild soap, if needed. DO NOT IMMERSSE IN WATER. The finger plates should merely be wiped with a soft, clean cloth.

Battery

The GSR 2 has been designed to minimize the use of battery current. The unit should function for the shelf life of the battery (6 months to 2 years). A decrease in volume and sensitivity indicates that the battery needs changing.

To change:

Remove the two screws and carefully separate the unit into

halves. Pry off the battery snaps, then remove the battery. Replace it with a high-quality 9v cell, preferably alkaline. Carefully fit the unit back together. When closing the unit, turn the screws only until resistance is felt.

Optional Equipment

1. Temperature Sensor

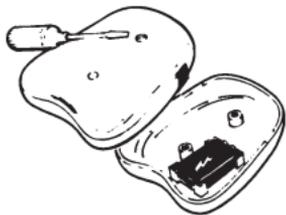
The reverse temperature sensor adds a completely different function to your GSR 2 and lets you experience a fascinating new area of biofeedback technology - temperature biofeed-

back. Generally, increasing levels of stress lessen the blood flow to your hands and feet. This causes decreases in hand and foot temperatures. With the monitoring help of the thermistor, you can learn to control that temperature. It's amazing when you realize what you're basically controlling is the dilation and constriction of blood vessels in your arms and legs.

The temperature sensor can also be used with the relaxation exercises described earlier in this manual.

To use:

1. Plug the temperature sensor into the protected pin input jack of the GSR 2.
2. Place the tip of the sensor on the pad of a finger (either hand) or on any toe. Use a different location each time you train to promote general hand or foot warming.



3. Wrap the Velcro® around your finger or toe to hold the sensor in place, using only enough pressure to hold it there. Do not apply pressure or inaccurate readings may result.
4. Important: Do not touch GSR 2 sensing plates while using the temperature sensor, as this will give you a false reading. Remember, the idea of relaxation with the reverse temperature sensor is to lower the tone, which indicates the hands are warming.
5. Set the dial of the GSR 2 to a pleasant low tone, or center the meter if you're using it. To lower the tone, relax completely and think of your hand and arm, or foot and leg, as heavy and warm.
6. The temperature sensor will allow you to hear changes in temperature as small as $.05^{\circ}\text{C}$ ($.1^{\circ}\text{F}$).
7. Note: **The temperature sensor must be unplugged when not in use to avoid battery drain.**

A thermometer is included with your temperature sensor to provide you with an absolute measure of hand or foot temperature. To use it, hold the red bulb loosely between your fingers or toes for approximately 1 minute. In general, normal maximum hand or foot temperature ranges between 90° - 96° F (32° - 36° C). Should your hand temperature fall within this range of 90° - 96° F you may still wish to try to increase your temperature through temperature biofeedback, even though the changes may be small. Learned changes that do occur in this range may facilitate your ability to raise the temperature through a greater range when your starting temperature is lower. The farther below 90° your hand or foot temperature is, the greater the potential range of increase in temperature.

Visualization Exercise for Temperature Biofeedback

1. Plug the temperature sensor into the protected pin jack, wrap the Velcro®* around your finger or toe, and get comfortable.
2. Close your eyes.
3. Focus on your breathing. Breathe evenly and deeply for several minutes.
4. Now visualize a warm place where you are relaxed and comfortable - on the beach, in a sauna or in the hot sun.
5. When the scene is fixed in your mind, think of your warm hands and feet. Feel the sensation and passively observe it.
6. When you begin to relax, your hands and feet will get warmer and the tone of the GSR 2 will fall. Passively observe this as well.
7. If you are successful at raising your temperature, pay attention to the internal sensations that accompany the increase. In that way, you may learn to achieve more direct control over hand and foot temperature variations without any electronic biofeedback help.



2. Dual Sensitivity Meter

Plugging the meter into the GSR 2's 2.5 mm output jack automatically turns off the tone and provides visual feedback on either temperature or skin resistance. The meter faces are

marked with divisions of $.1^{\circ}\text{F}$ and $.05^{\circ}\text{C}$. The dual sensitivity meter switched to the “1” position provides a maximum reading of $\pm 2^{\circ}\text{F}$ and $\pm 1^{\circ}\text{C}$. The “1/2” position doubles this range to $\pm 4^{\circ}\text{F}$ and $\pm 2^{\circ}\text{C}$.

When monitoring with the reverse temperature sensor, the needle moves counter-clockwise with warming.

For monitoring skin resistance, place your fingers on the sensing plates, or attach the remote electrodes, and slowly turn the dial on the GSR 2 until the meter needle centers. The meter moves counterclockwise as you relax. The numbers have no specific meaning in this mode, but can be used to note changes.

For users whose GSR changes rapidly, switching to the 1/2 sensitivity setting on the dual sensitivity meter doubles the training range and decreases frequent resetting of the dial.



3. Electrodes

The electrodes plug into the protected pin jack of the GSR 2. They allow you to use the unit from your pocket or purse, without having to hold it in your hand. This feature is very useful during sports such as golf or riflery, or when it is preferable to monitor from your toes in order to keep both hands free.

The electrodes can also be used if you have difficulty holding your fingers still on the GSR 2's fingerplates. (Cat. No. SA2050)

Specifications

Skin resistance range 1,000 ohms - 3,000,000 ohms.

Variable frequency range 0 to 40,000 Hz.

9 volt battery. Battery current in use < 2.0 mA.



2.5mm output jack for 8 ohm earphone and output meter.

Protected Pin input jack for thermistor and electrodes.

Products/Accessories

T2001M	GSR Unit
SA2000M.....	GSR Unit
SA2003.....	GSR Unit (Blue)
SA3409.....	MyoTrac/Dac Earphone 8 Ohms
SA2025.....	Cassette GSR2 English
SA2035.....	Manual GSR2 English

T2120M	GSR 2/Temp 2X
SA2000M.....	GSR 2 Unit
SA2003.....	GSR Unit (Blue)
SA3409.....	MyoTrac/Dac Earphone 8 Ohms
SA2025.....	Cassette GSR2 English
SA2035.....	Manual GSR 2 English
SA2050M.....	Remote Electrodes
SA2076.....	Dual Sensitivity Meter
SA2090M.....	Reverse Temperature Sensor
SA2007.....	Thermometer

Warranty

The GSR 2 and all equipment, including optional items, are guaranteed to be free from defects in material and workmanship for one year from the date of purchase. In the unlikely event that repair is necessary, Thought Technology Ltd. will repair or replace your GSR 2 free of charge. Return the unit postage prepaid and insured, with proof of purchase.

This warranty does not apply to damage, whether incurred through accident, alteration or abuse.

No other warranty is expressed or implied.

The GSR 2 is battery-operated. Batteries are not covered under this warranty. Remove dead batteries promptly to prevent corrosion damage.

Returning Defective Equipment

1. Send the unit(s) postage prepaid and insured, with proof of purchase to one of the addresses below.
2. If you are shipping from anywhere outside of Canada or from the USA to Canada, mark the package “Goods to be repaired – Made in Canada” to avoid unnecessary customs charges.
3. All customs and duty charges will be billed to you if incurred by sending the unit to the wrong address.
4. Provide a detailed description of the problem you are experiencing, and your telephone/fax number.

Ship insured to:

In the USA

Thought Technology Ltd.
8396 Route 9
West Chazy, NY 12992
USA

In Canada & other countries

Thought Technology Ltd.
2180 Belgrave Ave.
Montreal, Quebec
Canada H4A 2L8

www.thoughttechnology.com

Placing Orders:

To order call:

1 (514) 489-8251

FAX orders:

1 (514) 489-8255

Order Number: SA2035 (Manual GSR 2 English)

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