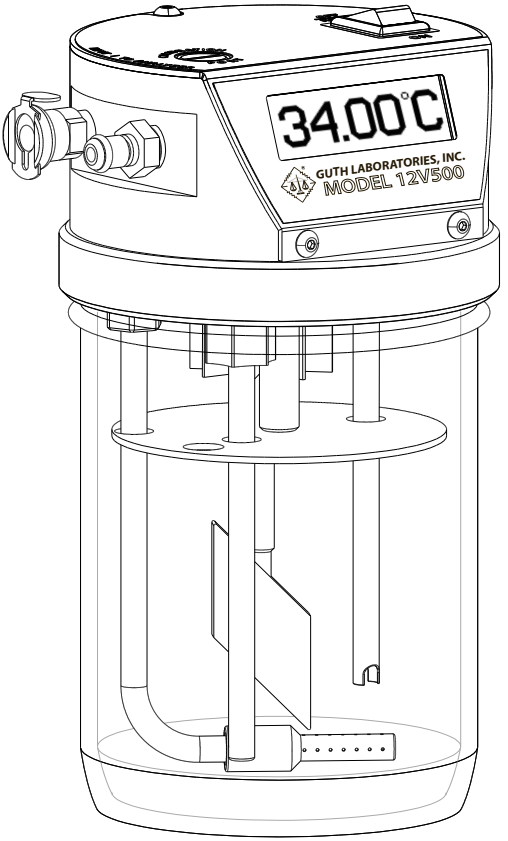
GUTH LABORATORIES, INC.

Wet Simulator Model 12V500

"DUPLEX"

U.S. PATENT NO. 7,895,878; 8,667,829
CANADIAN PATENT NO. 2684266



OPERATOR'S MANUAL

www.guthlabs.com

INTRODUCTION

The Guth Model 12V500 Alcohol Breath Simulator is a state-of-the-art, electronically temperature-controlled, water-alcohol instrument that provides a precise calibration standard for testing or calibrating alcohol breath analyzers. The Model 12V500 is the first simulator of its kind to incorporate dual temperature probes to independently control and monitor the temperature of the solution. The temperature of the water-alcohol solution placed in the simulator is maintained at 34°C ± .05°C or better. The inlet and outlet port pathways have been designed to be an integral part of the one-piece heated aluminum top housing, which allows for uniform heating and reduced condensation. The new LCD graphics display has a temperature resolution of 0.01°C and will display simulator's status to the user in the form of messages and status codes. As with all Guth products, the 12V500 has been engineered using the highest quality components to give reliable, accurate, and trouble free operation.

CERTIFIED SIMULATOR SOLUTION STANDARD

PLEASE NOTE: It is imperative your simulator solution be of the highest quality in order to acquire the scientific and legal standards of acceptance.

To establish a precise and accurate calibration standard when using a Guth simulator, GUTH LABORATORIES, INC. recommends using Guth certified simulator solution. Guth Laboratories, Inc., a pioneer and leader in the science of alcohol breath testing, has provided certified simulator solution to state, municipal, and local law enforcement agencies for many years.

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All Guth certified simulator solutions are traceable to NIST (National Institute of Standards and Technology).

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Guth certified simulator solutions are prepared in standard concentrations of .02%, .04%, .05%, .08%, .10%, .15%, .20%, and .30%. Other special concentrations are available upon request. Please contact Guth Laboratories, Inc. for availability and pricing:

Toll Free: (800) 233-2338 Fax: (717) 564-2555

or visit our web site at: www.guthlabs.com

STORAGE: Store Simulator Solution in a cool location. Do not place solution in a freezer.
- DO NOT REFRIGERATE SIMULATOR

COMPONENTS & FUNCTIONS

1. TOP HOUSING - The top housing incorporates all the important features of the simulator. The housing is heated and controlled by use of a head space heater (U.S. Patent # 8,667,829).

2. LCD DISPLAY - The display indicates the temperature of the solution with a resolution of .01°C. It also serves to give feedback to the user during use by displaying status messages. The display is backlit to allow easy viewing in all lighting conditions.

3. TEMPERATURE PROBE - The temperature probe consists of two separate ultra-stable precision thermistor beads. One thermistor bead is used to control the temperature of the solution at 34°C ± .05°C and the other independently monitors the temperature of the solution. In the event that either probe fails, a status message is generated on the display.

4. HEATING ELEMENT - The heater element is used to heat the solution to 34°C. It is electronically protected from overheating if the simulator would be turned on without solution in the container. In the event of a heater failure a status message will be generated on the display.

5. BAFFLE PLATE - The baffle plate prevents excess solution from entering the head space or outlet port during a test.

6. AGITATOR - The agitator designed by Guth Laboratories, Inc. stirs the solution to help maintain a uniform temperature. If the motor fails a status message will be displayed on the screen.

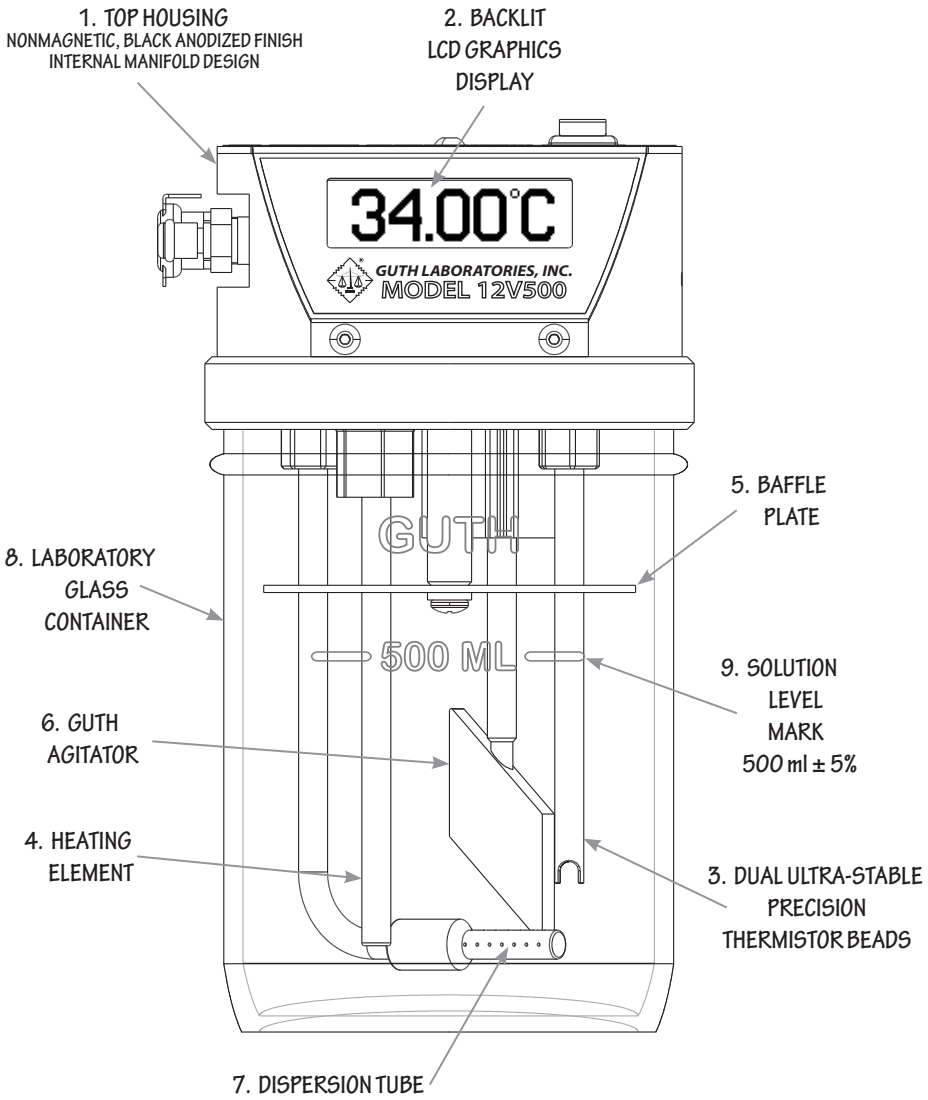
7. DISPERSION TUBE - A unique dispersion tube disperses the delivery air uniformly throughout the solution. Tube may be disassembled for cleaning.

8. GLASS CONTAINER - The glass container holds the solution and creates an airtight seal with the top housing. There is a mark on the container indicating the solution level at 500 ml ± 5% (#9, Page 3).

10. U.H.C. (Uniform Headspace Conditioner) - To ensure all tests performed by the Guth Model 12V500 are precise and accurate, an eight (8) blade radial fan is designed and included in the headspace area. The headspace area is heated by an imbedded controlled heater. The radial fan provides uniform headspace heating and the effluent at a constant concentration. (U.S. Patent# US9810682B1)

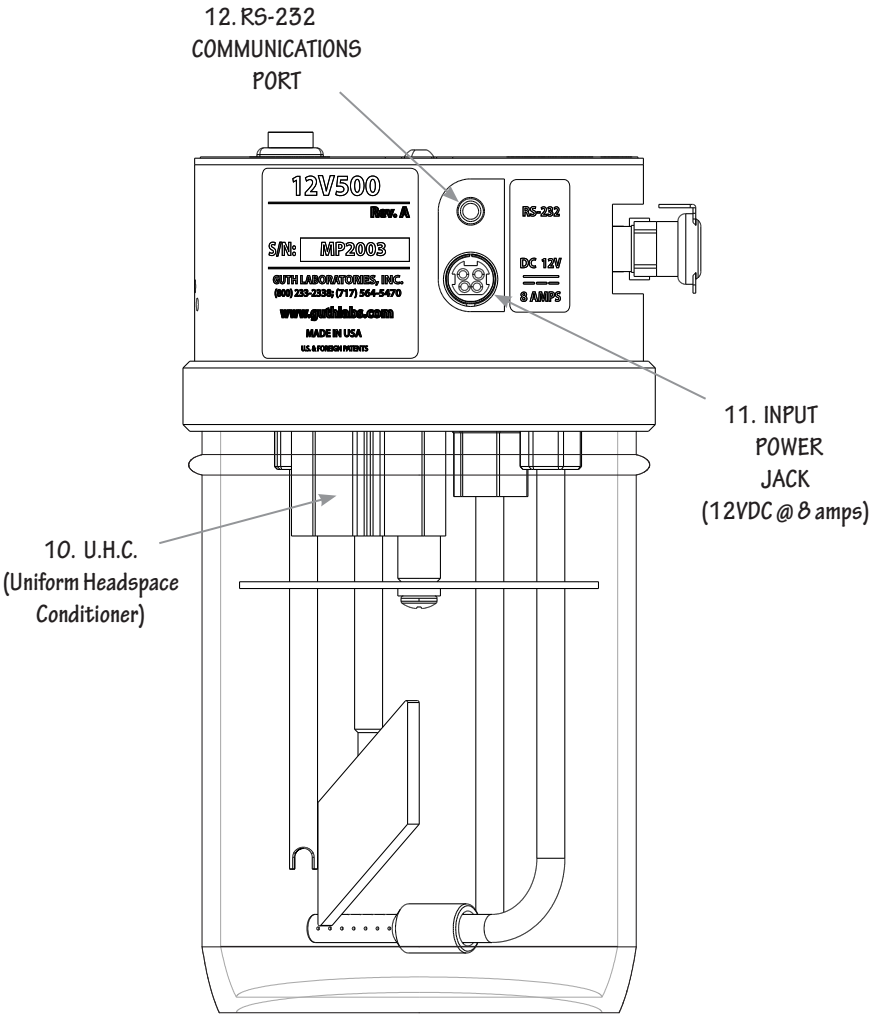
MODEL 12V500

(Front View)



MODEL 12V500

(Rear View)

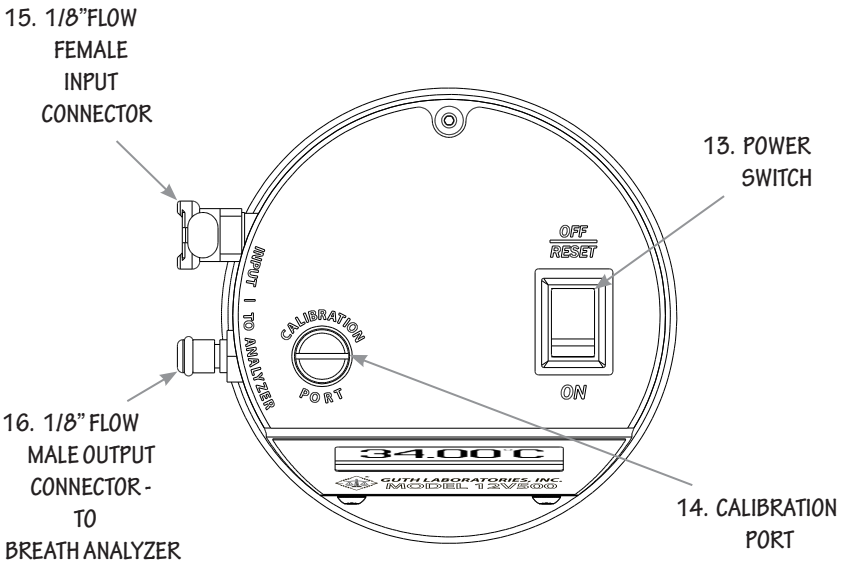


11. INPUT POWER JACK - The power jack serves as the input connector for the external power supply. The 12V500 can be run from the included desktop switching power supply or any 12VDC source capable of supplying 8 amps.

12. RS-232 COMMUNICATION PORT -The RS-232 port allows the simulator to be interfaced with breath analyzers that support serial communications.

MODEL 12V500

(Top View)



13. POWER SWITCH - The power switch is used to turn the simulator ON/ OFF. It also functions as a RESET switch.

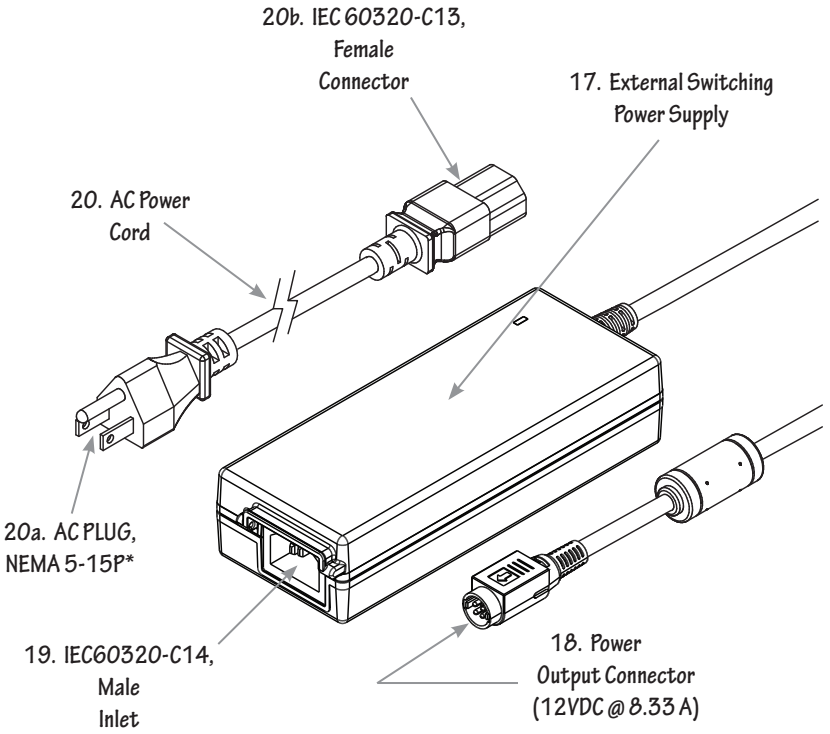
14. CALIBRATION PORT - The calibration port allows the temperature of the solution to be measured with an external thermometer.

15. FEMALE INPUT CONNECTOR - The standard input connector is a 1/8" flow female SureLoc that allows for easy and secure hook up to various air delivery methods. (Customized fitting options available)

16. MALE OUTPUT CONNECTOR - The standard output connector is a 1/8" flow male SureLoc that allows for easy and secure hook up for delivering the calibration sample to various breath analyzers. (Customized fitting options available)

MODEL 12V500

POWER SUPPLY



17. POWER SUPPLY - The included UL listed desktop switching power supply is capable of accepting an input from 100 - 240 VAC and providing an output of 12 VDC at 10 amps.

18. POWER OUTPUT CONNECTOR - The output connector supplies power to the 12V500. This connector plugs into the power jack on the rear of the simulator.

19. IEC60320-C14 - Accepts the female connector (IEC 60320-C13) for connecting the AC power cord to the power supply.

20. AC Power Cord - Used to connect the power supply to the AC power source.

20a. NEMA5-15P - Plugs into wall socket or receptacle.

20b. IEC60320-C13 - Plugs into the male inlet (IEC 60320-C14) for connecting the AC power cord to the power supply.

**Only used in North America.*

OPERATING INSTRUCTIONS

1. Unscrew the glass container from the simulator top housing. Pour 500 mL of certified simulator solution into the container. The Guth laboratory glass container has a 500 mL ± 5% fill mark.

CAUTION: Always disconnect power from the 12V500 before adding or changing solution.

CAUTION: Do not operate the 12V500 without the container being attached. Operating the simulator without the container could result in personal injury or property damage.

2. Reassemble the simulator with the glass container. Be sure the container is properly seated to the top housing. **DO NOT OVERTIGHTEN.** To check that the system is airtight cover the outlet port while blowing into the input port. If back pressure is evident and very few air bubbles are observed emanating from the dispersion tube the system is airtight.

3. Insert output connector from external power supply to input power jack of simulator. Insert AC power cord into power supply. Plug power supply into wall outlet.

4. Turn the power ON. The simulator will beep and the screen shown in figure 1 will be displayed.

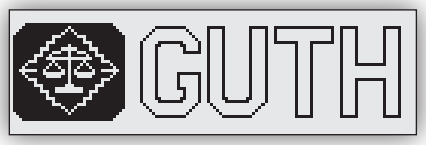


FIGURE 1

5. After approximately 5 seconds the display will change to the screen shown in figure 2. During this time the simulator will perform an internal diagnostic check.

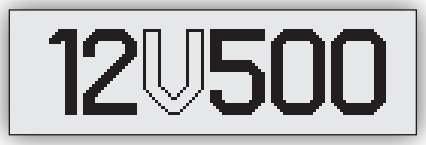


FIGURE 2

6. Figure 3 will be displayed during the warm up cycle. The snow flake icon indicates that the simulator is still cold and is not ready for use. The temperature of the solution is displayed in the upper right hand corner of the screen. The bottom right hand corner shows the status of the top housing temperature.

FIGURE 3

7. The solution temperature will increase until the set point of 34.00°C has been attained. When the set point for the top housing is reached the status bar will no longer blink and will be completely filled to the right (Figure 4).

FIGURE 4

8. After both set points have been reached there will be a period of approximately 1 minute before the ready screen will be displayed (Figure 5).

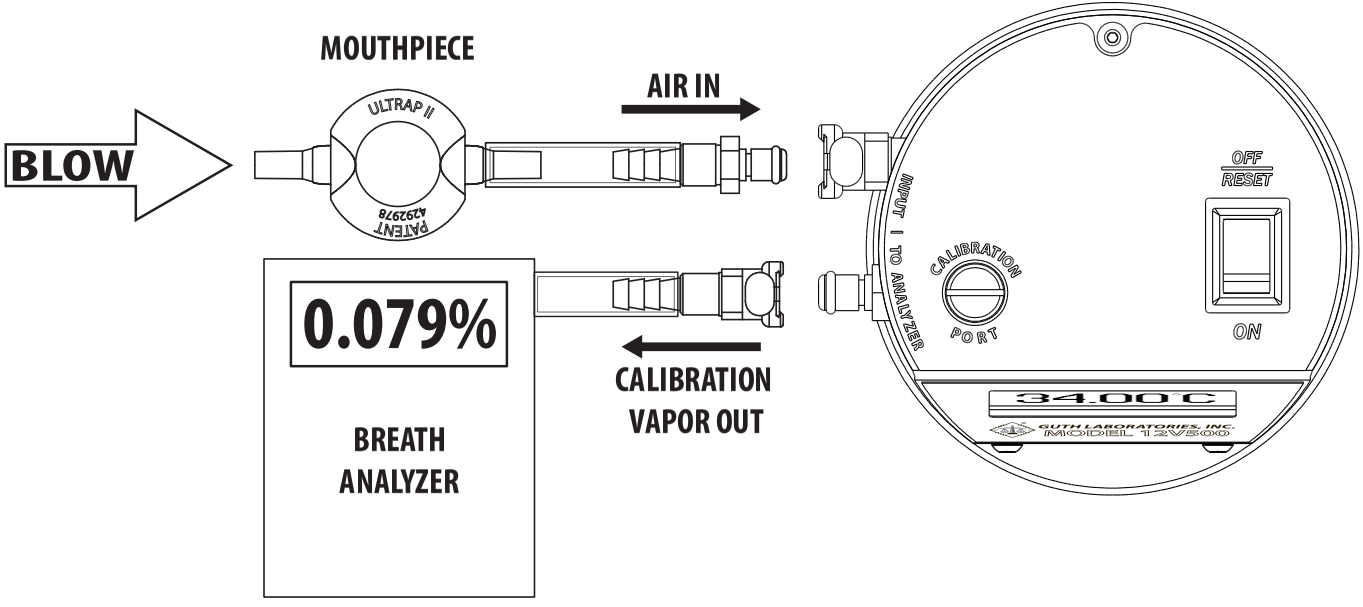
FIGURE 5

9. The simulator will beep indicating that it is ready. It is normal for the simulator to display temperatures in the range of 33.95°C to 34.05°C.

10. Follow the operators manual provided by the manufacturer of the breath analyzer being used for detailed instructions on how to connect and use the simulator to perform a calibration or accuracy check. See diagram on next page for basic hookup and operation.

When manually operating the simulator, take a deep breath and blow into the mouthpiece firmly and steadily for 4 to 7 second duration. The blowing technique should imitate a person providing a breath sample into the breath test analyzer.

Rather than manually blowing into the simulator, the following alternative means also fulfill the requirement of providing air through the tubing attached to the simulator: the breath analyzers internal pump, a simulator bellows pump, a pump-powered air source, or an atomizer. Several precision models of pumps are available for purchase through Guth Laboratories, Inc.


MOUTHPIECE
BLOW
ULTRAP II
PATENT 4292978
AIR IN
0.079%
BREATH ANALYZER
CALIBRATION VAPOR OUT
INPUT TO ANALYZER
CALIBRATION PORT
OFF RESET
ON
34.00C
GUTH LABORATORIES, INC.
MODEL 12V500

CARE & MAINTENANCE

Cleaning the Simulator -

The top housing may be cleaned using a mild detergent and a soft cloth.

To clean the components within the container and destroy any algae mix 1 TABLESPOON (15ml) of CHLOROX per 1 GALLON (3.75L) of WATER. Pour approximately 500 ml of prepared Chlorox solution into container and replace top assembly. Soak for 3-6 hours, remove container and carefully rinse components with cold water (DO NOT rinse with HOT water). Hot water could shock or break the thermistors. Do not allow water to enter top housing while rinsing. Allow the simulator to AIR dry before returning to service.

Maintaining the Simulator -

Inspect the laboratory glass container, with every solution change, for chips or cracks that may prevent an airtight seal. Replace if necessary (P/N: GU-1125-SC).

CAUTION: Use care when handling chipped or broken containers to reduce the chance of personal injury.

Inspect the container gaskets looking for uneven wear, cracking, or tears. Replace if necessary (P/N: GU-1125-VI). The gaskets should be lubricated periodically using a grease approved by GUTH LABORATORIES, INC. Packets of grease are available for purchase from Guth Laboratories, Inc. (P/N: GU-1170-SG).

Inspect the O-ring on the male Sureloc connector for wear. Replace if neccessary (1/4" Sureloc, P/N: GU-VALV-OR , 1/8" Sureloc, P/N: GU-1152-OR).

Inspect the thermistor beads for buildup of algae. If algae is present please follow the directions detailed above for cleaning components within the container.

Over time the holes in the dispersion tube may become blocked impeding air flow into the simulator. Replace (P/N: GI-1106-BT) or clean the dispersion tube by removing it from the stainless steel inlet pipe by pulling it free. Once free a wire brush may be used to dislodge any debris within the tube and the holes may be cleaned with a small pick. Thoroughly rinse the dispersion tube before reassembling.

TEMPERATURE CHECK

Guth Laboratories, Inc. recommends that the temperature of the 12V500 should be verified annually using a calibrated thermometer that is traceable to a recognized national standards body. Guth Laboratories, Inc. offers a calibrated thermometer traceable to NIST for calibrating and checking the temperature of the 12V500 (P/N: GK-222-555).

Trouble Shooting

The Model 12V500 provides internal diagnostics that monitor proper simulator operation. If a monitored system detects a condition that is outside of the normal operation parameters, the simulator will deactivate the solution and head space heaters as well as the agitator motor. The simulator will emit an audible alarm and display the detected condition code number on the LCD followed by a message and icon detailing the condition. The LCD will alternate displaying the status code and message until the condition is corrected or the simulator is reset. The audible alarm will stop after 1 minute.

Resetting The Simulator

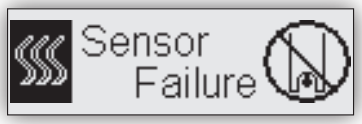
Turning the power off and on will reset the simulator.

Status Codes and Messages

The following list of status codes and messages indicate the cause and corrective action:

PROBLEM: No solution in container or simulator power has been turned on with top housing not attached to the container.

REMEDY: Turn the simulator off. Fill container with 500 ml of certified solution and reassemble top housing and container.



PROBLEM: The temperature sensor for the heater control circuit is either open or shorted.

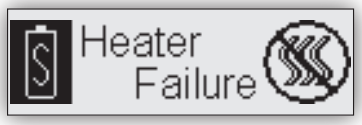
REMEDY: Cannot be remedied in the field. Requires service.

PROBLEM: The temperature sensor for the thermometer circuit is either open or shorted.

REMEDY: Cannot be remedied in the field. Requires service.

PROBLEM: Temperature of solution is above 34.20°C after initially reaching 34.00°C.

REMEDY: Turn off the simulator and allow the solution to cool. Turn the simulator on. If the condition continues to occur the simulator needs recalibration or service.



PROBLEM: Excessive amount of time for solution temperature to increase. The heating element may be open or the solution was too cold.

REMEDY: Reset the simulator. If the simulator does not heat, the heating element may be defective. Requires service.

PROBLEM: Temperature of solution has dropped below 33.80°C after initially reaching 34.00°C.

REMEDY: Turn off the simulator. Wait a few minutes then turn back on. If the condition continues to occur the simulator needs to be recalibrated or requires service.

PROBLEM: The temperature control circuit and the thermometer are reporting different temperatures.

REMEDY: The simulator needs to be recalibrated.

PROBLEM: The agitator is not spinning.

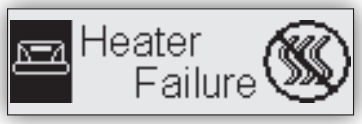
REMEDY: Turn the simulator off. Remove container from simulator. Check for and clean any corrosion that has built up around the motor shaft. Manually spin agitator by hand. If agitator spins freely reassemble simulator. If the condition continues service is required.

PROBLEM: Temperature of top housing has dropped below 34.5° C after initially reaching set point.

REMEDY: Turn off the simulator. Move simulator into a warmer environment. Wait a few minutes then turn back on. If the condition continues to occur the simulator requires service.

PROBLEM: Temperature of top housing has risen above 36.0° C.

REMEDY: Turn off the simulator. Move simulator into a cooler environment. Wait a few minutes then turn back on. If the condition continues to occur the simulator requires service.



PROBLEM: Excessive amount of time for top housing temperature to increase. The heating element may be open or the top housing was too cold.

REMEDY: Reset the simulator. If the top housing does not heat, the heating element may be defective. Requires service.

Calibration and Repair

Guth Laboratories, Inc. offers simulator calibration traceable to NIST. Annual calibration by our technicians ensures that the simulator is giving the most reliable and accurate results for your breath testing needs.

If repairs are needed, the Model 12V500 must be repaired by a Guth certified technician or returned to Guth Laboratories, Inc for service.

Please visit our website, for calibration or repair service, at www.guthlabs.com/rma/ to fill out the RMA form. Please print this form and return it with the simulator to the following address:

GUTH LABORATORIES, INC.
590 North 67th Street
Harrisburg, PA 17111-4511
(717) 564-5470 or (800) 233-2338

NOTE: When returning the simulator, it is imperative the laboratory glass container is attached. This is necessary to protect critical parts of the simulator. Please empty the solution from the container and thoroughly dry all components. Carefully wrap the simulator in bubble wrap, newspaper, paper towels, etc. Package the simulator well placing packing material UNDER, AROUND, and ABOVE the simulator.

Specifications

Power Adapter: Input: 100-240VAC, 2.0A, 50-60Hz
Output: 12VDC @ 10A, 120.0W

12V500 Input Specification: 12VDC, 82W

Operating Temperature: 1ºC to 33ºC (34ºF to 91ºF).

Temperature Stability: +/- 0.05ºC

Warm-up Time: < 10 minutes @ 20ºC

Recovery Time Between Tests: < 5 seconds

Solution Amount: 500mL

RECORDS (SERIAL NUMBERS, CALIBRATION AND NOTES)

NIST TRACEABLE THERMOMETER – SERIAL NUMBER_____

CERTIFIED BY_____DATE_____

TEST TEMPERATURE_____ °C NIST TRUE TEMPERATURE_____ °C

MODEL 12V500 – SERIAL NUMBER_____

CALIBRATION CHECK DATE	CHECKED BY

NOTE: Only a Guth Laboratories, Inc. certified technician shall perform Field calibration.

WARRANTY

Simulators manufactured by GUTH LABORATORIES, INC. are guaranteed to be free from defects in workmanship and material for a period of one year from the date of purchase. GUTH LABORATORIES, INC. will repair or replace, at its option, any unit becoming defective within that period, except when such defects result from obvious abuse or improper use of the instrument.

Simulators serviced and repaired by GUTH LABORATORIES, INC. will carry a ninety (90) day workmanship guarantee, except when obvious abuse or improper use is determined. When a defective part is replaced under warranty, the new part will be guaranteed for the duration of the original warranty, or a period of ninety days, whichever is greater. When a defective part not under warranty is replaced, the new part will be guaranteed for ninety days.

This warranty by GUTH LABORATORIES, INC. is subject to the following conditions:

GUTH LABORATORIES, INC.:

A) Reserves the right to determine whether failure is or is not covered by the warranty.

B) Will not honor any obligations, expressed or implied, except as so stated above.

C) Is not liable for any inconvenience, loss of use, or consequential damages resulting from service requirements.

D) Will not honor service by any unauthorized agencies or modifications by user.

If your simulator requires warranty service, please follow the instructions in the 'Calibration and Repair' section for returning your simulator. It is imperative that the solution be emptied, and the container must accompany the simulator top assembly to protect the internal parts against damage. **Important:** Returning the simulator without the container will void the warranty. Shipping charges, duties, and taxes must be prepaid. Return shipping to the customer is paid by Guth Laboratories, Inc.

GUTH LABORATORIES, INC.
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Harrisburg, PA 17111-4511

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Fax: (717) 564-2555

www.guthlabs.com

customerservice@guthlabs.com

Revision 1G, 10/25