

ALCOSIM™

BREATH ALCOHOL SIMULATOR



Instruction manual

Alcohol Countermeasure Systems Corp

60 International Boulevard
Toronto, Ontario M9W 6J2 CANADA

T +1 416 619 3500
F +1 416 619 3501

info@acs-corp.com
acs-corp.com

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INTRODUCTION

PRODUCT PROFILE

The ALCOSIM breath alcohol simulator is used to calibrate various breath alcohol testers. Using an embedded electronic device with a closed loop temperature control system, the ALCOSIM simulator generates breath flow to provide a precise calibration standard. The simulator also uses an alcohol reference solution, the concentration of which is very sensitive. To accurately simulate human breath, the temperature of the water-alcohol solution used in the solution container is maintained at $34\text{ }^{\circ}\text{C} \pm 0.02\text{ }^{\circ}\text{C}$.

PRODUCT FEATURES

The ALCOSIM simulator is sleek and sturdy, and includes the following features:

- Microprocessor controlled, closed loop temperature system
- 7-segment Liquid Crystal Display (LCD) with a wide viewing angle
- Dual temperature sensor
- Maintains a precise temperature at $34\text{ }^{\circ}\text{C} \pm 0.02\text{ }^{\circ}\text{C}$
- Brushless DC motor, operating at 24VDC, capable of running 24/7
- System for detecting motor failures due to mechanical and electrical defect
- Audio and visual indication of system malfunction

TECHNICAL SPECIFICATIONS

- Height: 200mm
- Diameter: 105mm
- Weight: 1.1 kg (with power supply but w/o solution)
- Operating temperature: $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$
- Storage temperature: 5 to $40\text{ }^{\circ}\text{C}$
- Storage humidity: 10 to 85% RH
- Warm-up time from cold start: < 15 minutes
- Recovery time from test: < 5 seconds
- Power supply rating: 24VDC, 2.5A, works with both 110V and 220V supplies

LIMITED WARRANTY

All ACS products are warranted to be free of defects in workmanship and materials for a period of one year from the date of shipment. ACS agrees to replace or repair any defective device, provided the defect was not caused by misuse or mishandling.

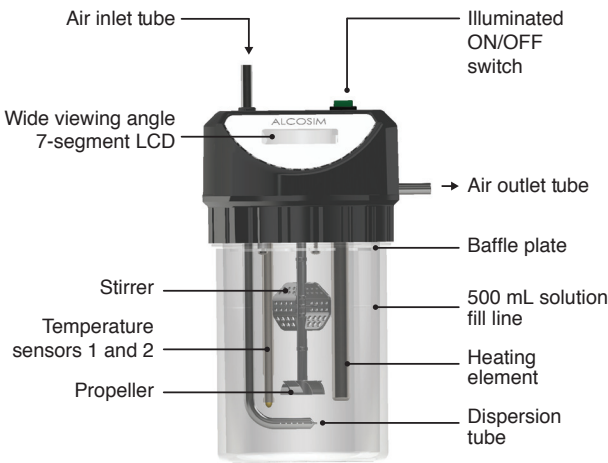
Any ALCOSIM simulator being returned for warranty repairs must be properly packaged and shipped prepaid to an authorized service provider.

ASSISTANCE

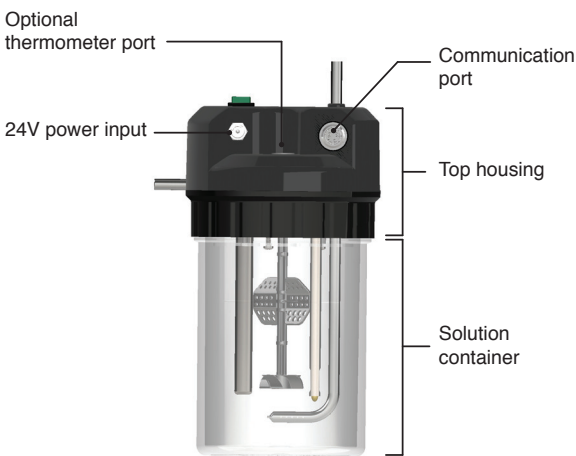
For assistance, contact your local authorized service provider or visit acs-corp.com.

ALCOSIM BREATH ALCOHOL SIMULATOR
- OVERVIEW

The ALCOSIM simulator is used by technicians to calibrate and verify breath alcohol testing devices. The simulator is a wet-bath calibration / verification device.



FRONT



BACK

SAFETY AND PRECAUTIONS

WARNING: Failure to comply with the warnings and precautions in this manual may cause personal injury, product damage, voiding of product warranty or a failed calibration.

ALCOSIM SETUP, USAGE AND DISASSEMBLY

- The ALCOSIM breath alcohol simulator is intended for authorized technicians only
- Use the ALCOSIM simulator for its intended purpose only
- Use parts specified by ACS only
- Before use, check that the simulator power supply rating (24VDC, 2.5A) conforms to local supply ratings
- Do not disassemble product, except as specified
- Do not attempt to repair product; you must contact an authorized service provider
- It is recommended that calibration be done indoors, in a service facility
- CAUTION! When assembling, disassembling or preparing the ALCOSIM breath alcohol simulator for use, ensure that it is not plugged into an electrical outlet
- CAUTION! Hot surface – avoid contact with the heating element
- Place the ALCOSIM simulator on a flat surface, free from obstruction
- Do not expose the simulator to direct sunlight for extended periods of time
- Do not use the simulator with any toxic or flammable liquids, or in explosive atmospheres
- Recommended: use the simulator within room temperature environments ($23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$)
- The solution container, tubing and mouthpieces must be completely dry; even slight condensation may disrupt calibration
- Fit tubing or mouthpieces on an aquarium air pump or a similar setup for drying
- CAUTION! Never connect the simulator to an electrical outlet without first adding solution and attaching the top housing
- The simulator requires 500 mL of solution; the fill line is marked on the simulator container
- Do not under or over fill the simulator container
- Do not over tighten the top housing
- Connect the simulator cables neatly to ensure simple disconnection after use
- Do not force a misaligned cable connector into place
- Disconnect the simulator power immediately if solution overheats considerably beyond $34\text{ }^{\circ}\text{C}$

- Disconnect the simulator power after use
- **CAUTION!** After disconnecting the simulator power, allow 10 to 15 minutes for the heating element to cool before detaching the top housing
- Empty out the solution container at the end of the work day
- Store the simulator in an environment of 5 to 40 °C and 10 to 85% RH

ALCOHOL REFERENCE SOLUTION

- Use the solution concentration specified in the manual for breath testing devices
- Replace solution every 5 days or 20 tests
- Use of solution over time affects alcohol concentration
- Do not use a solution bottle with a broken seal, or an expired bottle
- Never use artificial methods to reheat or cool solution, or the solution container
- Keep solution at room temperature
- Do not freeze or refrigerate solution
- Do not ingest solution
- If solution is ingested, do not induce vomiting; contact your local poison control centre
- Keep solution away from eyes
- If solution comes in contact with eyes, flush eyes with water; if irritation continues, contact your local poison control centre
- Refer to your local environmental regulations for more information about safe solution-disposal amounts
- Dispose solution down a drain

CLEANING THE ALCOSIM BREATH ALCOHOL SIMULATOR

- Disconnect the ALCOSIM breath alcohol simulator power before cleaning
- **CAUTION!** After disconnecting the ALCOSIM simulator power, allow 10 to 15 minutes for the heating element to cool off before detaching the top housing
- Do not submerge the top housing in water
- Clean the top housing by wiping with a water dampened cloth
- Wash the solution container with plain water and dry with paper towel

CALIBRATION MATERIALS

- Alcohol Reference Solution, available in concentrations from 10 to 170 mg/dL.
- ALCOSIM kit (includes ALCOSIM simulator and all accessories):
 - Australian kit ACS 94-001200
 - UK kit ACS 94-001210
 - European kit ACS 90-001220
 - North American kit ACS 94-001230
 - Japanese kit ACS 94-001240
 - Brazilian kit ACS 94-001250
- ALCOSIM kit contents include:
 - ALCOSIM breath alcohol simulator ACS 79-007600
 - AC power cord: part number depends on your region
 - Power supply (24VDC, 2.5A) ACS 07-000075
 - 50cm of vinyl tubing ACS 70-000002
 - Liquid Trap Mouthpiece ACS 79-001955
 - Round mouthpiece ACS 95-000250

ALCOHOL REFERENCE SOLUTION OVERVIEW

The technician adds solution of precise BrAC to the ALCOSIM breath alcohol simulator for calibration / verification of breath testing devices.

- Supplied in 500 mL tamper-sealed bottles
- Premixed and ready for immediate use with the ALCOSIM simulator

For availability, pricing and ordering, contact your local authorized service provider or visit acs-corp.com.



ALCOSIM SETUP AND OPERATION STEPS

1. With the ALCOSIM breath alcohol simulator power disconnected, turn the top housing counter clockwise (left) and detach it from the container.
2. Add the entire contents of the 500 mL bottle of alcohol reference solution into the ALCOSIM solution container.

The bottle contains the exact liquid volume required for calibration, which is also marked on the ALCOSIM container.

3. Return the top housing onto the container, be careful not to over tighten.
4. Connect tubing with the round mouthpiece to the ALCOSIM simulator air inlet and tubing with the liquid trap mouthpiece to the air outlet.
5. Perform a leak check by covering the air outlet tube with your thumb and blowing into the air inlet tube.

Air bubbles should not appear in the solution. In case of bubbling, check that the ALCOSIM head is tightened properly. Return the ALCOSIM to an authorized Service Provider if the problem persists.

6. Connect the power cable to the simulator power input and to a wall outlet.
7. Switch on the simulator. The following occurs:

- The LCD display illuminates and the simulator beeps
- The propeller rotates and the heating element activates
- Cold is displayed until solution reaches 32 °C, wherein the LCD screen displays actual solution temperature
- The simulator maintains solution at a constant 34 °C \pm 0.02 °C

Solution heat-up takes about 10 minutes. When 34 °C \pm 0.02 °C is displayed, the simulator is ready to provide a breath sample.

8. Use the ALCOSIM simulator to blow air into the breath alcohol tester that you are calibrating. There are two ways of doing this:
 - Manually: take a deep breath and blow for the duration of the breath test sample period
 - Mechanically: use a pump-powered air source (Recommended flow rate: 14.4 L/min)

TROUBLESHOOTING

The following table lists error codes that may appear on the screen of the ALCOSIM simulator. The error codes are accompanied by a periodic beep.

ERROR CODE	DESCRIPTION	WHAT TO DO
Er 11	Motor malfunction.	Switch off the ALCOSIM simulator, wait 5 seconds and switch it on again. If the error message persists, return the simulator to an authorized service provider.
Er 13	Transistor malfunction.	
Er 21	Temperature sensor 1 has no current.	
Er 22	Temperature sensor 1 short circuit.	
Er 23	Temperature sensor 1 leak.	
Er 25	Electric potential meter 1 damage.	
Er 31	Temperature sensor 2 has no current.	
Er 32	Temperature sensor 2 short circuit.	
Er 33	Temperature sensor 2 leak.	
Er 35	Electric potential meter 2 damage.	
Er 41	Heater malfunction.	
Er 52	<p>The water level in the jar is lower than normal.</p> <p>The power supply used is not adequate.</p>	<p>Fill the jar to the correct liquid volume of 0.5L.</p> <p>Use the power supply provided with the ALCOSIM.</p>
Er 54	<p>Alcohol reference solution temperature above 34 °C for longer than 3 minutes.</p> <p>The ALCOSIM simulator attempts to restore temperature to 34 °C. If it cannot, the heater disables and an Er 54 message appears.</p>	<p>NOTE: Use the simulator within room temperature environments (23 °C ± 5 °C).</p> <p>Turn the simulator off in order for the alcohol reference solution to cool down. Turn it on again when appropriate.</p>
Er 55	<p>Alcohol reference solution temperature above 37 °C.</p> <p>The heater automatically disables and an Er 55 message appears.</p>	

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