DRIVESAFE™

BREATH ALCOHOL TESTER

Calibration 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

DRIVESAFE HANDSET COMPONENTS

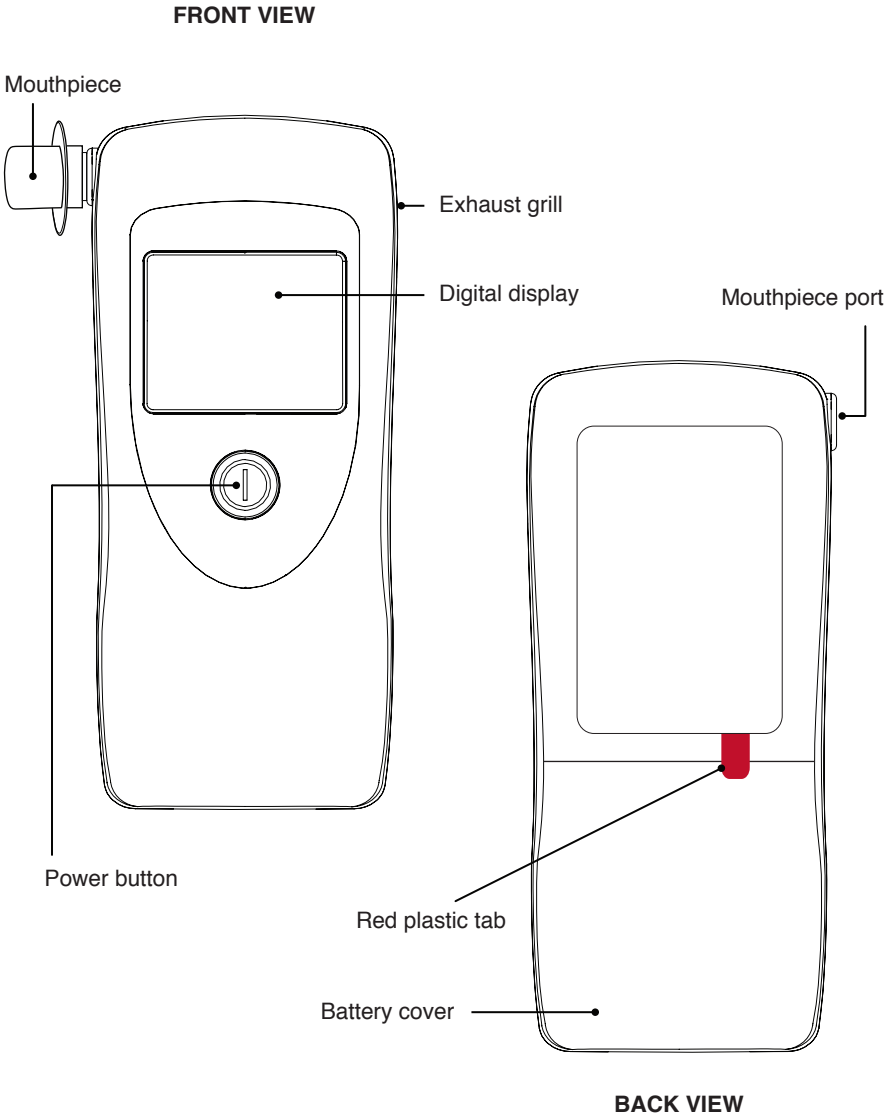


TABLE OF CONTENTS

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.

GENERAL

- 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

COMPRESSED GAS SAFETY

- Damaged or broken valves can turn a canister into an unguided missile. Attach the valve in a safe location
- Calibration should be performed indoors, in a service facility, where the gas standard cylinder can be properly stored
- Transportation and storage of compressed gases in vehicles is dangerous and should be avoided
- Examine the canister and valve for any damage; pay close attention to the expiration date on the label
- Observe all cautions and safety warnings found on the canister
- Never remove or alter canister labels
- Never modify the delivery tube in any way
- Always remove the valve and install the protective cap on cylinders when not in use
- Store cylinders in a cool, well ventilated area, away from sources of heat

ALCOSIM SETUP, USAGE AND DISASSEMBLY

- 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 °C ± 2 °C and approx. 50% RH)
- 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
- If solution overheats considerably beyond 34 °C, disconnect the simulator power immediately
- 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 a 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 TYPES

There are two methods of calibration for the DRIVESAFE breath alcohol tester:

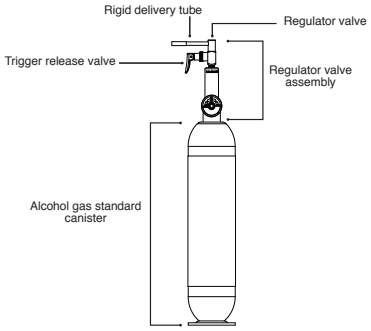
- Alcohol Reference Standard (ARS), which uses the ALCOSIM breath alcohol simulator. See “Alcohol Reference Standard (ARS) Calibration”
- Gas Standard, which uses an alcohol gas standard cylinder. See “Gas Standard Calibration”

To ensure accurate results, three calibration cycles may be necessary. The first cycle starts the calibration and subsequent cycles are used to ensure that the same threshold is met.

GAS STANDARD CALIBRATION

CALIBRATION MATERIALS

- 105 L, 70 F cylinder of alcohol gas standard 0.24 mg/L (50 mg/dL), ACS #95-000426
- Regulator valve assembly (6 L/min flow rate): ACS #94-000225 (trigger); ACS #94-000226 (push button)



DRY GAS CALIBRATION PROCESS

1. Remove the protective cap of the canister and screw on the regulator valve assembly.

2. Attach the rigid delivery tube to the regulator valve.

3. Press the power button on the DRIVESAFE tester.

4. When **READY** is displayed at the bottom of the tester screen, press the power button quickly in this sequence (the tester beeps with each click):

(CLICK) – (CLICK) – (PRESS AND HOLD FOR 5 SECONDS)

5. The backlight flashes amber (it may flash up to 7 times); count the flashes for the next step.

6. Press the power button as many times as the backlight flashed.

UEt is displayed.

7. Press the power button 2 times in quick succession to change the calibration method.

drY is displayed.

8. Press and hold the power button for 3 seconds.

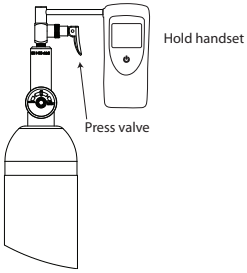
CAL and **001** are displayed.

NOTE: If* CAL *is blinking, the date for the calibration has expired. You may still continue the calibration.

9. Insert the rigid delivery tube from the regulator valve into the mouthpiece port of the tester.

Hold the tester in place for the next step.

10. Press and hold the regulator valve down to release the gas while still holding the tester.



11. Release the regulator valve when the tester tone ends and the tester clicks.

WAIT flashes on the tester screen for up to 40 seconds.

Depending on the sensor calibration drift, up to 3 samples may be required. **001**, **002** and **003** indicate the current sample number.

Once the tester is calibrated, the sample numbers disappear and **READY** is displayed at the bottom of the tester screen.

Proceed to the next step for verification.

VERIFY THE DRIVESAFE BREATH ALCOHOL TESTER

1. Insert the delivery tube from the regulator valve into the mouthpiece port of the DRIVESAFE tester.

Hold the tester in place for the next step.

2. Press and hold the regulator valve down to release the gas while still holding the tester.

3. Release the regulator valve when the tester tone ends and the tester clicks.

When a breath sample is accepted, the tester displays the results within a few seconds.

The results of the verification test should indicate a BrAC of 100 mg/dL; subtle variations may be expected. If the result is ± 5 mg/dL off of 100 mg/dL, perform the calibration again.

NOTE: If the calibration fails on numerous attempts, the sensor may need to be replaced. Contact an authorized service provider for return instructions.

ALCOHOL REFERENCE STANDARD (ARS) CALIBRATION

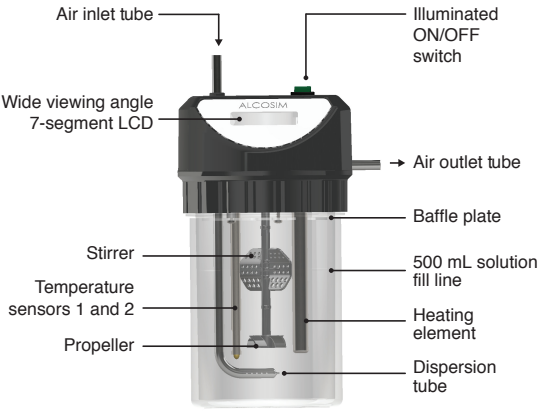
CALIBRATION MATERIALS

- Alcohol Reference Solution, 100mg% ACS #95-000310
- ALCOSIM kit (includes the ALCOSIM breath alcohol 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
    - 1.5 feet of vinyl tubing ACS #70-000002
    - Square mouthpiece ACS #95-000121
    - Round mouthpiece ACS #95-000250

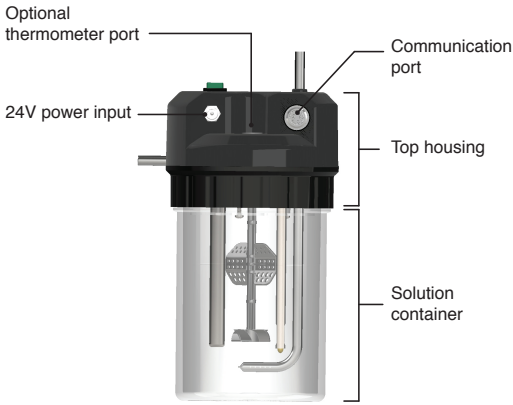
ALCOSIM BREATH ALCOHOL SIMULATOR – OVERVIEW

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

PARTS DIAGRAM

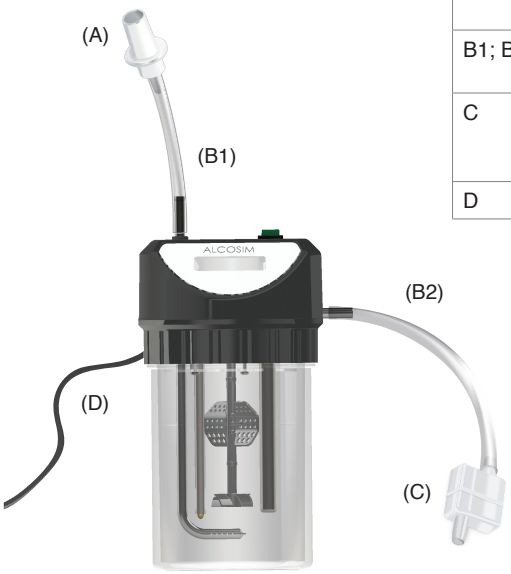


FRONT



BACK

KIT CONNECTION DIAGRAM



A	Round mouthpiece (for manually blowing into the simulator)
B1; B2	Plastic tubing (cut to size by a technician)
C	Square mouthpiece (connects to a breath tester)
D	Power cord

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
- This calibration requires a bottle of 100 mg% solution

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 100 mg% 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 square 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, refer to the “Troubleshooting” section in this manual.

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 ºC, wherein the LCD screen displays actual solution temperature
- The simulator maintains solution at a constant 34 ºC ± 0.2 ºC

Solution heat-up takes about ten minutes. When 34 ºC ± 0.2 ºC is displayed, the simulator is ready to provide a breath sample.

ARS CALIBRATION PROCESS

1. Press the power button on the DRIVESAFE breath alcohol tester.

2. When **READY** is displayed at the bottom of the DRIVESAFE tester screen, press the power button quickly in this sequence (the tester beeps with each click):

(CLICK) – (CLICK) – (PRESS AND HOLD FOR 5 SECONDS)

3. The backlight flashes amber (it may flash up to 7 times); count the flashes for the next step.

4. Press the power button as many times as the backlight flashed.

UEt is displayed.

5. Press and hold the power button for 3 seconds.

CAL and **001** are displayed.

NOTE: If CAL is blinking, the date for the calibration has expired. You may still continue the calibration.

6. Insert the tip of the square mouthpiece into the sensor inlet of the tester.

7. Blow into the round mouthpiece of the ALCOSIM breath alcohol simulator. Keep blowing until the tester tone ends and the tester clicks.

WAIT flashes on the tester screen for up to 40 seconds.

Depending on the sensor calibration drift, up to 3 samples may be required. **001**, **002** and **003** indicate the current sample number.

Once the tester is calibrated, the sample number disappears and **READY** is displayed at the bottom of the tester screen.

Proceed to the next step for verification.

VERIFY THE DRIVESAFE BREATH ALCOHOL TESTER

1. Insert the tip of the square mouthpiece assembly into the sensor inlet of the DRIVESAFE breath alcohol tester.

2. When **READY** is displayed on the DRIVESAFE tester, blow into the round mouthpiece of the ALCOSIM breath alcohol simulator. Keep blowing until the tester tone ends and the tester clicks.

   When a breath sample is accepted, the tester screen displays the results within a few seconds.

   The results of the verification test should indicate a BrAC of 100 mg/dL; subtle variations may be expected. If the result is ± 5 mg/dL off of 100 mg/dL, perform the calibration again.

NOTE: If the calibration fails on numerous attempts, the sensor may need to be replaced. Contact an authorized service provider for return instructions.

TROUBLESHOOTING

In the event of a calibration failure using the ALCOSIM simulator, consult the "Troubleshooting — Error Codes" section of the ALCOSIM Breath Alcohol Simulator Instruction Manual (ACS #60-000180).

If a calibration fails while using an alcohol gas standard cylinder, it may be due to the following:

- Plastic tubing has been overused or condensation is present
- The alcohol gas standard cylinder is expired
- All connections to and from the gas valve are not secured properly

ACS
ALCOHOL COUNTERMEASURE SYSTEMS

CAM-ENG-60-000199-B