ALCOLOCK™

WR2 Calibration Station
Instruction Manual

Federal Communications Commission (FCC) Disclaimer

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operations are subject to the following 2 conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operations.

Industry Canada

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) L'appareil ne doit pas produire de brouillage, et
(2) L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Contents

1.0 Introduction

The ACS Calibration Station (CS) is diagnostic equipment designed to establish and maintain compliance of the ALCOLOCK WR2 alcohol interlock Handset (HS). The following are main components required for HS calibration:

- Calibration Station
- WR2 Electronic Control Unit (ECU) programmed to Auto-Cal mode
- WR2 Handset (HS)
- ALCOSIM breath alcohol simulator
- Power supply
- Aquarium air pump
- INTERTRACK™ enterprise software (ITE)

For successful calibration, ensure that all components of the CS assembly are connected correctly. This manual will show you how to safely connect and operate the CS assembly, and to calibrate the ALCOLOCK WR2 device.

ATTENTION!

General

- **This manual is for authorized service technicians only**
- **Do not use ALCOSIM simulator with toxic liquids, flammable liquids or in explosive atmospheres**
- **Use the product for its intended purpose only. Failure to do so will void the warranty and may cause injury and damage the components**
- **Avoid contact with the ALCOSIM heating element: CAUTION – Hot Surface**
- **Only use parts supplied by Alcohol Countermeasure Systems Corp**
- **Do not open any enclosures. Doing so will void the warranty and may cause injury and damage the components within. Contact your Service Provider if any hardware is not working**
- **Ensure that the proper amount of solution is added; do not under-fill or over-fill the ALCOSIM simulator**
- **If the ALCOSIM simulator overheats considerably beyond 34°C, turn it off and contact your Service Provider**
- **Before use, inspect all components for visible cracks or damage. Failure to do so may cause injury or additional damage**
- **Do not force a cord into a port or input, as doing so will damage the components**

Moisture, contamination and cleaning

- **The mouthpiece connector and all tubing must be completely dry before setup. Even slight condensation may disrupt the procedure. Before beginning a calibration, make sure that all moisture has been completely removed from the ALCOSIM simulator**
- **The ALCOSIM jar must be completely clean and dry before you apply the alcohol reference solution. Remove the ALCOSIM top housing before cleaning the solution jar**
- **If liquid spills onto the CS or any other components, remove liquid with a cloth and allow to dry thoroughly. If there is substantial moisture damage, keep all components powered off and contact your Service Provider**
- **To clean the CS and ALCOSIM simulator: use a water dampened cloth to remove dirt or dust from the surface, and allow it to dry thoroughly. Do not use cleaning products on the surface, as doing so may cause damage**
- **After drying, remove all cloths or paper towels from the CS and its components**

Power

- **Check that the ALCOSIM simulator power ratings conform to the local supply rating**
- **Power Off the ALCOSIM simulator after use**
- **When assembling, disassembling or preparing ALCOSIM simulator for use, ensure that it is not plugged into an electrical outlet until you have been instructed to do so**
- **Do not switch on the ALCOSIM simulator and CS until instructed**
- **Do not plug in the ALCOSIM simulator or connect the CS power wires until instructed**
- **Ensure that the power supply is disconnected until instructed**
- **If the ALCOSIM simulator was powered on, wait 15 minutes for the components to cool off before removing the top housing**
- **Never open the ALCOSIM top housing when the simulator is switched on or plugged in**
- **Do not disconnect any components while calibration is in progress**
- **Failure to follow these instructions may result in injury or may damage the devices**

Alcohol reference solution

- **Keep away from eyes. In case of contact, flush eyes with water. If irritation continues, contact your local poison control centre**
- **Do not ingest. In case of ingestion, do not induce vomiting. Contact your local poison control centre**
- **Do not use a solution bottle with a broken seal, or a solution bottle that has expired**
- **Keep at room temperature. Do not freeze or refrigerate**
- **It is safe to dispose of alcohol reference solution in the drain. Refer to your local environmental regulations for more information about safe disposal amounts**

2.0 Glossary of terminology

Verification Process: The complete process used to verify the measurement accuracy of the HS.

Calibration Process: The complete process used to recalibrate the HS to allow it to complete the verification process after adjustment.

3.0 ACS part numbers

This section list parts supplied by ACS, which are required by the Service Centre for the calibration of the ALCOLOCK WR2 device. Contact ACS to order the following parts (for contact information, refer to acs-corp.com).

Product	ACS Part #	Qty
Calibration Station	79-004401	1
ALCOSIM breath alcohol simulator assy	79-007600	1
Power supply (24V DC) with ACS label (65-000580)	07-000063	1
Alcohol reference solution 50 mg/dL (0.50 g/L)	95-000305	1 bottle
WR2 Genius+	94-000506	1
Mouthpiece connector	79-001956	1
Plastic tubes	70-000002	2
ALCOSIM communication cable add-on	79-007851	1
Power cord	07-000062 (N.A.) 07-000061 (EU)	1
Connection cable Genius – PC	79-000817	1
Elite aquarium air pump 801	40-000030	1

***NOTE*:** *ALCOSIM simulator, aquarium air pump and power supply part numbers will vary with different voltages.*

4.0 Part descriptions

Read the following part summaries before beginning calibration setup.

4.1 Power supply

The power supply is an ACS provided part, but a locally purchased unit may be employed. The power supply must provide sufficient current for successful operation of the CS, or it can lead to HS pump failures. 14amp output is the minimum.

4.2 Auto-Cal ECU

The Auto-Cal ECU is a specially modified ECU that:

- Must be programmed for the jurisdiction
- Cannot be used as a normal ECU

4.3 ALCOSIM breath alcohol simulator

The simulator calibration method uses a known water alcohol solution to produce an air to alcohol vapor. To simulate the human breath, this vapour is thermostatically maintained at a constant temperature of 34°C. The result is an accurate method of recreating a known breath alcohol concentration (BrAC).

4.4 Calibration Station (CS)

The CS pump assembly is a metal box that contains an air pump and capacitor that are controlled by the ECU. The box has:

- A communication plug for the ECU
- An air outlet tube
- A communication cable to connect to the ALCOSIM communication cable add-on (79-007851)
- An isolating switch (pump switch) to allow it to conduct basic ECU tests without energizing the pump

4.5 Aquarium air pump

The aquarium air pump aids in the quick drying of the mouthpiece connector.

4.6 ITE software

The ITE software application downloads the calibration record from the ECU, for analysis.

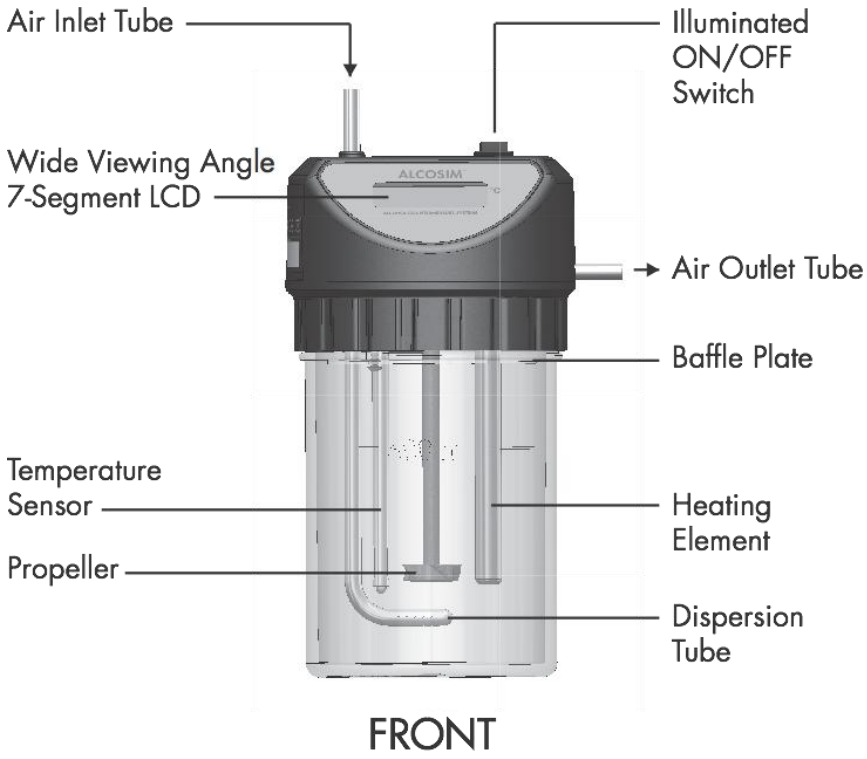
4.7 Alcohol reference solution

The alcohol reference solution used in the CS is provided by ACS Corp in 500 mL containers. Each container is labelled with:

- BAC value of the solution
- Lot number of the solution
- Serial (bottle) Number of each container
- Date of manufacture
- Expiry date

Check that the solution is the correct value – 50 mg/dL (0.50 g/L) – required for calibrating, and the date is not expired.

5.0 ALCOSIM breath alcohol simulator diagram



6.0 Calibration Station (CS) diagram

1	Fastening pad (ECU)
2	Fastening pad (HS)
3	Communication plug (to ECU)
4	Power wires
5	Pump switch
6	Communication cable (to ALCOSIM)
7	Air outlet tube

7.0 Unpacking, inspection and operating check

ATTENTION! ***Note the following before unpacking any components or adding water to the ALCOSIM simulator:***

- ***Ensure that the ALCOSIM simulator is unplugged and switched off until instructed***
- ***Ensure that the CS is switched to "pump disabled" and is disconnected from a power source until instructed***
- ***Ensure that the power supply is disconnected until instructed***
- ***If the ALCOSIM was powered on, wait 15 minutes for the components to cool off before removing the top housing***
- ***Never open the ALCOSIM top housing when the simulator is switched on or plugged in***
- ***Failure to follow these instructions may result in injury or may damage the devices***

7.1 Inspecting the ALCOSIM simulator

1. Carefully unpack and visually inspect the unit.
2. Disassemble the solution jar from the top housing by turning the top housing counter-clockwise.
3. Carefully lift the top housing so that the internal components (e.g., the propeller) do not touch the jar.
4. Place 500 ml of tap water into the container and replace the top housing. Do not over-tighten.
5. Connect plastic tubing to the air outlet **(side)** and the air inlet **(top)**.
6. Cover the air outlet tube with your thumb and blow into the air inlet tube.

   It should not be possible to blow into the ALCOSIM simulator and cause bubbling of air through the solution. If air can be freely blown into the ALCOSIM simulator, the rubber "O" ring seal is either damaged or misaligned. In this case, remove the top housing and reposition the seal. Replace the seal if it is worn or damaged.
7. Check that the ALCOSIM simulator power rating conforms to the local supply rating.
8. Connect the power cord to the ALCOSIM power input and to the AC wall port and switch on the ALCOSIM simulator.

ALCOSIM power input:

ALCOSIM power switch:

The ALCOSIM heaters and mixing propellers *automatically* activate. The ALCOSIM simulator begins heating the solution to 34°C. This takes up to 20 minutes. The ALCOSIM screen displays the solution temperature.

9. If the ALCOSIM simulator operates correctly, turn the power switch off and disconnect the power. Wait 15 minutes for the components to cool off.
10. Remove top housing from the container. Discard water, dry out the container and tubing and wipe off components attached to the top housing. Reassemble the top housing for storage.

7.2 Inspecting the CS

Unpack the CS and check for physical damage. Check all electrical and tube connections. Connect to power supply and check functionality.

7.3 Inspecting the ECU

Unpack the ECU and check for physical damage. Check the electrical connector. Connect to the CS, switch power on and check for normal ECU functionality. Disconnect and switch off the CS when finished.

7.4 Inspecting the aquarium air pump

Unpack the aquarium air pump and check for physical damage. Check the electrical connector. Check that the aquarium air pump power rating conforms to the local supply rating. Plug into an AC outlet. Check for normal air pump functionality.

7.5 Inspecting the power supply

The power supply is an ACS provided part, but a locally purchased unit could be employed. The power supply must provide sufficient current for successful operation of the Auto-Cal station, or it can lead to Handset pump failures. 14amp output is the minimum.

8.0 Detailed operation

8.1 ALCOSIM breath alcohol simulator

ATTENTION! ***Note the following before adding solution to the ALCOSIM simulator:***

- ***Ensure that the ALCOSIM simulator is unplugged and switched off until instructed***
- ***Ensure that the CS is switched to "pump disabled" and is disconnected from a power source until instructed***
- ***Ensure that the power supply is disconnected until instructed***
- ***If the ALCOSIM was powered on, wait 15 minutes for the components to cool off before removing the top housing***
- ***Never open the ALCOSIM top housing when the simulator is switched on or plugged in***
- ***Failure to follow these instructions may result in injury or may damage the devices***

Preparation of the ALCOSIM simulator is critical to successful and repeat calibrations, and departure from even minor details can create extra work. The following steps are required to ensure correct operation.

1. Disassemble the solution jar from the top housing by turning the top housing counter clockwise.
2. Clean ALCOSIM jar.
3. Add a new 50 mg/dL solution into the ALCOSIM jar, filling to (but not above) the fill line marked midway up the jar.

4. Note batch number and serial number of solution used.

   NOTE: *Keep the empty bottle to input to the WR2 Genius+.*

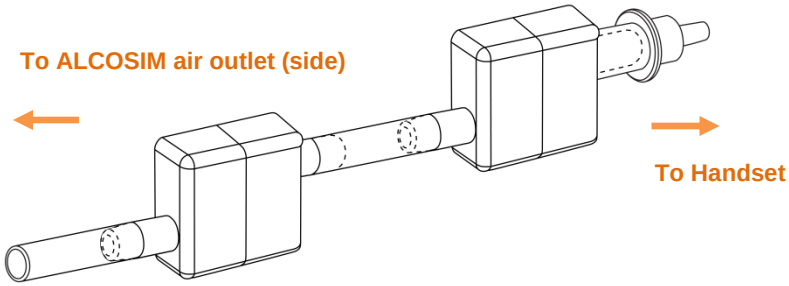
5. Connect the ALCOSIM power input to a wall port. Switch ON the ALCOSIM simulator.

ALCOSIM power input:

ALCOSIM power switch:

The propeller begins turning and the solution automatically begins heating up to 34°C. This takes up to 20 minutes. The ALCOSIM screen displays the temperature.

6. Connect a plastic tube from the ALCOSIM air outlet (side) to the mouthpiece connector, setting the connector as follows:

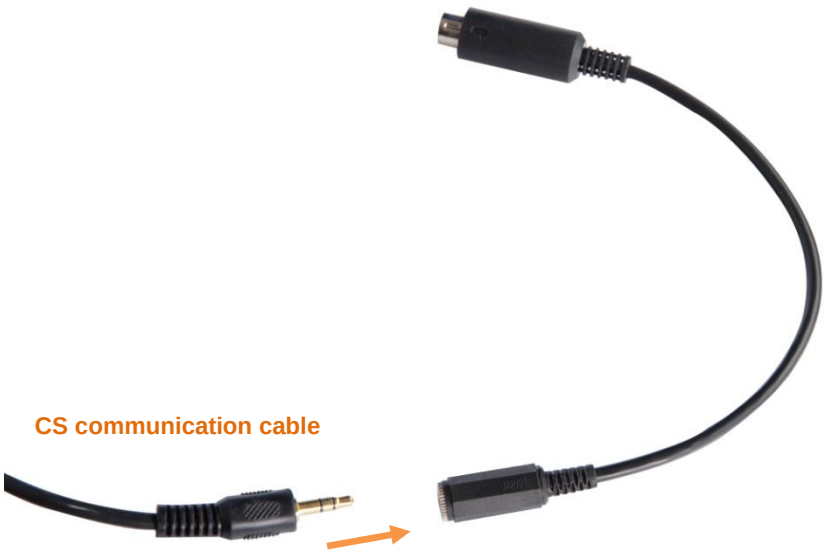


NOTE:

- *Incorrect use of the mouthpiece connector (e.g., upside down or with condensation) will lead to **out of range** / **inconsistent calibration** action by the CS, and cause return of the HS*
- *Change the mouthpiece connector after every 6 tests (e.g., two HS calibrations), or if droplets of liquid collect*
- *Fit the mouthpiece connector for drying onto aquarium air pump immediately after removal to ensure adequate supply of connectors*

7. Connect the CS air outlet tube **(front)** to the ALCOSIM air inlet **(top)**.

8. Connect the CS communication cable **(front)** to the ALCOSIM communication cable add-on (79-007851).

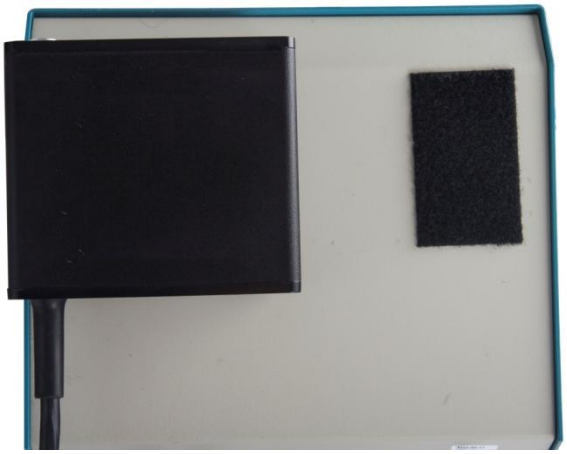


9. Connect the ALCOSIM communication cable to the ALCOSIM communication port.

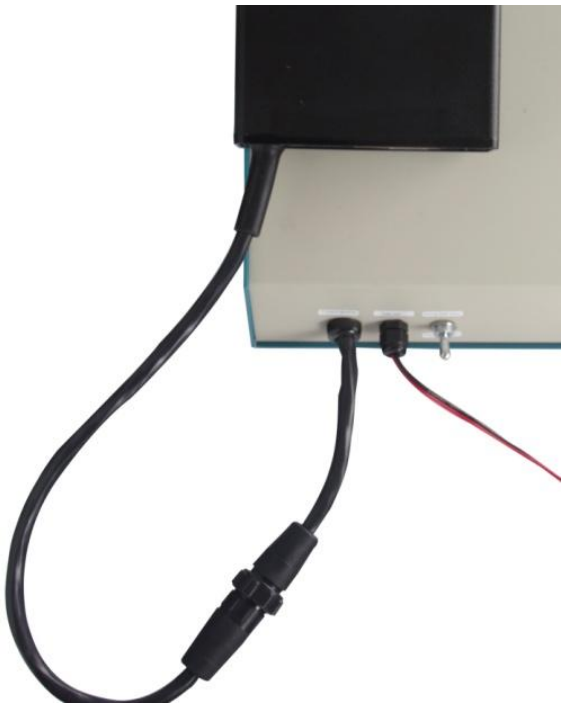
ATTENTION! ***Make certain that the pegs align; the plug is brittle.***

10. Connect the CS red and black wires **(front)** to the red and black output terminals of the power supply **(Back)** and return the binding posts. Plug in power supply to a wall port.

11. Connect the ECU to the left CS fastening pad.



12. Connect the ECU power plug to the CS power input cable **(front)**.

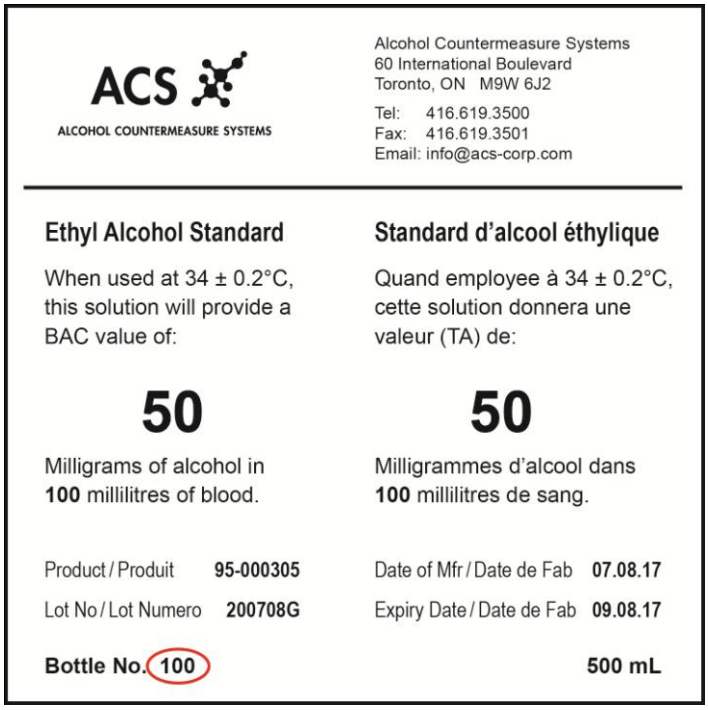


The ECU automatically powers on.

13. Connect the WR2 Genius+ to the ECU communication port.

14. Press ECU button to **Zero** tests.
15. The ECU displays **Service**.
16. On the Genius WR2+, press 3 **(DIAGNOSTIC)**.
17. Press 6 **(PREVIOUS)** or 9 **(NEXT)** to scroll to **Bottle #** and press # to select.

18. Referring to your solution bottle label, use the WR2 Genius+ key pad to enter the bottle number (see example circled below), and press **7(OK)**.



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Ethyl Alcohol Standard

When used at 34 ± 0.2°C, this solution will provide a BAC value of:

50

Milligrams of alcohol in **100** millilitres of blood.

Standard d'alcool éthylique

Quand employee à 34 ± 0.2°C, cette solution donnera une valeur (TA) de:

50

Milligrammes d'alcool dans **100** millilitres de sang.

Product / Produit **95-000305**
Lot No / Lot Numero **200708G**
Date of Mfr / Date de Fab **07.08.17**
Expiry Date / Date de Fab **09.08.17**

Bottle No. 100
500 mL

19. The ECU displays **OK**.
20. Unplug the Genius WR2+ from the ECU. The test counter on the WR2 ECU is reset 25 tests.
21. Connect the HS cable to the ECU communication port **(Front)**.

22. Connect the back of the HS to the right-side HS fastening pad, with the HS sampling port facing forward.

23. Switch the CS to “Pump Enabled” **(front)**.

24. Press the ECU button to **Zero** tests.

NOTE:

- *The test counter on the ECU counts down from 25 tests/5 days*
- *Change the solution after 25 tests or 5 days (whichever comes first)*
- *Use of the solution beyond 25 tests will lead to **out of range** / **inconsistent calibration** action by the CS, and cause return of the HS*

8.2 Functional test

When an operational HS is connected, the ECU initially displays the old calibration factor, followed by **WAIT**. It then begins a warming up and functional test process which checks the HS for the following:

- Blow tube temperature
- Pump temperature
- Fuel cell temperature
- Pump operation

ATTENTION! Failure of any of these tests will cause the HS to be disabled, and no further testing can be undertaken until the unit has been returned to your distributor. If a defective HS is connected, the ECU will display the error message and make a rejection sound, and prevent testing.

On successful completion of the functional testing, the ECU will display **PRESS BUTTON TO START** to subject the HS to verification and calibration processes.

ATTENTION! A calibration cannot commence unless the ALCOSIM communication cable is connected and the alcohol solution is at the correct operating temperature.

8.3 Verification process

The HS is tested two to three times for compliance in the calibration BAC range and, in particular, the verification BAC range.

Press button to commence testing. The ECU will display to following messages during testing:

- - - - -	While sample being injected
WAIT	While test sample being analyzed
WAIT…..	While purging

These steps will be repeated one to two times to complete the verification test.

After two tests in this range, the message **VerifyOK** will be displayed on the ECU and the HS can be used.

Push button to show the following:

- Old calibration factor
- New calibration factor
- BAC 1
- BAC 2

NOTE: *After a successful verification process, the old and new calibration factors will be the same.*

8.4 Calibration process

If the verification is not successful, but the HS is in the calibration BAC range, it is automatically calibrated by subsequent tests and software action designed to bring the HS into the verification BAC range.

Press button to commence testing, the ECU will display to following messages during testing:

- - - - -	While sample being injected
WAIT	While test sample being analyzed
WAIT…..	While purging

These steps will be repeated two to three times to complete the calibration test.

After three tests (sometimes four) in this range, the message **CAL DONE** will be displayed on the ECU, and the HS can be used.

Press button to show:

- New calibration factor
- Old calibration factor
- BAC 1
- BAC 2
- BAC 3
- BAC 4 (sometimes)

If calibration is unsuccessful, the HS will be disabled and must be recalibrated at your distributor.

8.5 Successful testing

On completion of successful testing, the HS can be used for a further 67 days. All calibrations completed on the CS are retained in memory for uploading during the CS read procedure.

9.0 Test memory of solution use

The CS internal counter will maintain in memory the number of tests completed on the solution. Once the maximum number of tests has been performed, the audible tone will sound and a display message will appear to alert the operator to change the solution.

If the ALCOSIM simulator is not at the correct temperature, incorrectly connected, or becomes disconnected during the calibration procedure, the ECU will display the message: **Solution Not Ready**, and suspend testing until the connection has been resumed.

10.0 Automatic disabling

The CS is pre-programmed to disable any HS that does not pass the calibration parameters. Once disabled, the HS cannot be reactivated. Disabled HSs should be immediately returned to your distributor.

11.0 Resetting the internal counter (changing solution)

After 25 tests or 5 days the **Change spit trap and solution. Verify 50 mg%** message will display.

ATTENTION! *Never use the Alcohol solution beyond 5 days or 25 tests. The HS will be incorrectly calibrated or unnecessarily disabled.*

To reset the internal counter, insert the Genius+ into the Auto-Cal ECU. Press the **Diagnostic** key and press the **Previous** key twice until **Bottle #** is displayed on the screen. Verify that the solution value you are using is 50 mg/dL (0.50 g/L). Press the # key and enter the bottle number from the new bottle of alcohol solution, then press **OK**. The internal counter is now reset. The genius can now be disconnected. The bottle number will be stored into the internal memory for later audit.

Every morning prior to turning the ALCOSIM simulator on, check the number of tests available. If only several tests are left you may wish to change the solution prior to starting calibrations, as warming the solution will take up to 20 minutes.

12.0 Synchronization

Every 60 days, the CS must be connected to ITE for a CS read transaction to download the calibration information for transfer to the central computer during SYNC operations. If the read procedure is not completed, the CS will display **Permanent Lockout** until the procedure is complete.

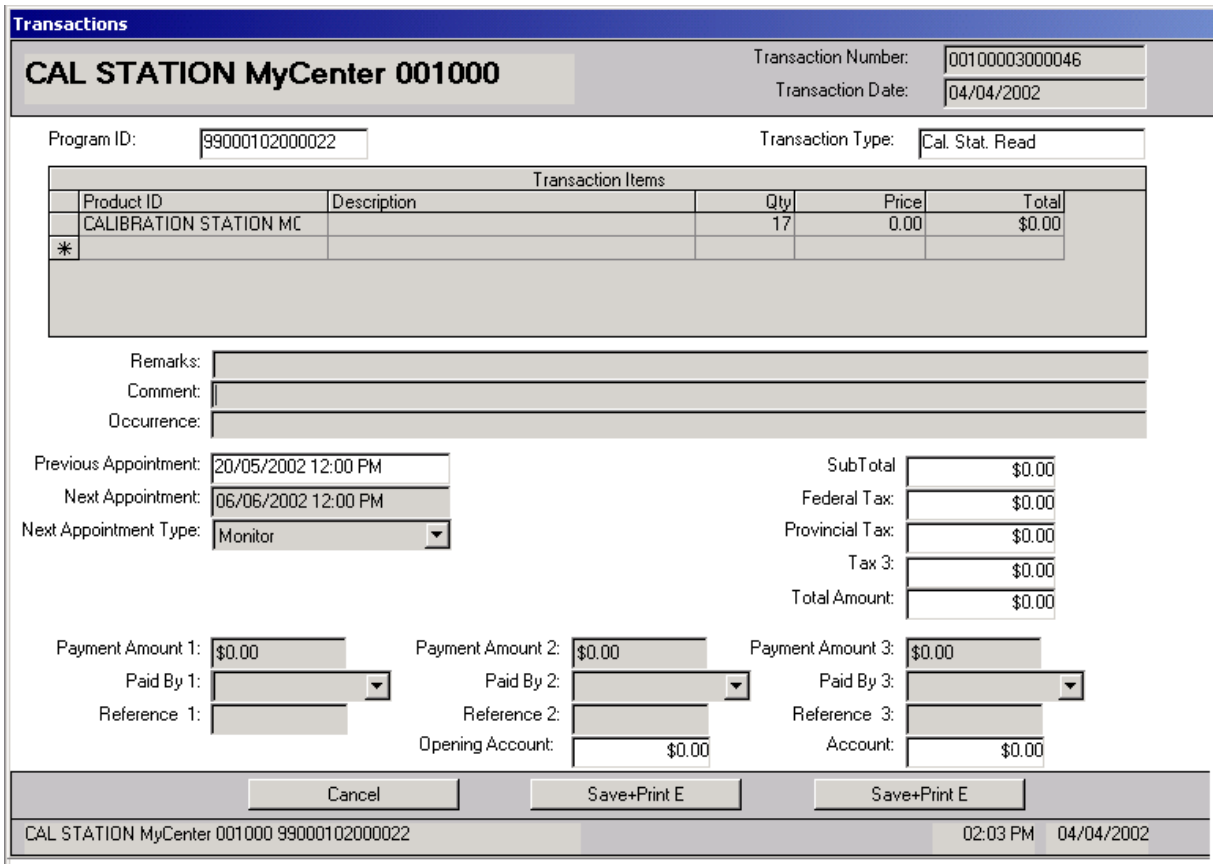
12.1 CS Read Procedure

The CS read procedure is a form of monitoring which is designed to upload the contents of the CS log into the database at preset intervals.

Open ITE on PC and find the appropriate CS by first clicking on **Find Client Name** button at the top right hand side of the **Clients** screen and choosing the appropriate CS, or by pressing the **Find Connected Client** button.

Start the transaction by clicking on the **New Transaction** button.

Click on the Transaction Type: pull-down menu and select **Cal Stat. Read**. A Transaction Screen similar to the following will be displayed:



At this stage, proceed to the CS and complete the following Genius+ procedure.

1. Connect Genius+ to ECU on CS.
2. Enter with the USER ID for the Genius+ as follows:
   a) Select **Diagnostic** (number 3 on key pad)
   b) Select **Previous** (number 6) - the ECU screen will show **Enter ID**
   c) Select **Odometer** (Button #) on the genius to enter # plus 3 digits
   d) Press **OK** (number 7)
3. The ECU will respond with a double-beep to confirm the number was entered correctly and the screen will show **OK**.

   NOTE: *Leave the calibration area after connecting the Genius to the PC cable.*
4. Return to ITE and press the **Save and Print** button to start the transaction.

   The **Monitor** screen will appear, and the progress of the read transaction can be observed.
5. The ECU will sound a triple-beep to indicate that the transaction is complete.

   The CS is now ready for calibrating the HS and recording activity for the next readout.

12.2 Result

The contents of the Auto-Cal ECU are transferred to the Service Centre PC for transfer to the central computer during synchronization. There is no printout of log details to the Service Centre, but data management staff may review the record to discern any departures from procedures. Some international jurisdictions require these records for ongoing certification.

13.0 Reusing mouthpiece connectors

The condensation may be removed from the mouthpiece connector by connecting it to the aquarium air pump when “foggy” and before condensation pools into fluid.

14.0 Troubleshooting

14.1 ALCOSIM simulator – troubleshooting checklist

In the event of a calibration failure, first check that:

- The plastic tubing is not overused, and it is free of condensation
- The alcohol reference solution value is 50 mg/dL (0.50 g/L)
- The alcohol reference solution is not expired and has not been in the ALCOSIM simulator for more than 5 days
- All connections to and from the ALCOSIM simulator are correct and secure

14.2 ALCOSIM simulator – troubleshooting table

If	Then
There is a leak in the seal.	The rubber ”O” ring seal is damaged or misaligned. Remove the top housing and reposition the seal. Replace the seal if it is worn or damaged. Call service if you need a replacement “O” ring.
The ALCOSIM simulator does not reach or maintain a solution temperature of 34°C.	The thermostat or heating element may be defective. Send for service.
There is condensation in the plastic tubing.	Fit the plastic tubing on an aquarium air pump, or similar setup, for drying.

15.0 CS – Messages displayed

Message	Description
Wait…	HS is being purged
READY	ECU is ready to perform next task
- - - - - - - -	Sample being injected at correct pressure/volume
wait	Sample is being analyzed
Permanent Lockout	ECU has exceeded the period for monitoring by CS read
Cal. Mode	ECU is in calibration mode
Connect Handset	Connect HS to commence calibration
Solution not Ready	ALCOSIM simulator not ready, or not communicating with ECU
- - test(s), - day(s) remaining	Readout of the number of tests and days remaining before fluid change
Change spit trap and solution. Verify 50mg%	Counter has reached the set limit of 25 tests/5 days
Check spit trap. Verify ALCOSIM simulator temperature and solution 50mg%	Check spit trap for moisture; check ALCOSIM simulator temperature; check that solution is 50 mg%.
Press Button to Start	Press button to start calibration procedure
Low pressure: Press button to continue	Insufficient air pressure from pump to conduct testing
BAC:	Blood alcohol concentration
Cal. Done	HS calibration procedure completed successfully
VerifyOK	Calibration of HS has been verified
BAC1=	First BAC readout during process
BAC2=	Second BAC readout during process
Old- - - - -	Old calibration factor
New- - - - -	New calibration factor
Last Calibrated	The last date when HS was calibrated.

16.0 Problem statements

ATTENTION! ***If any of the below problem messages are displayed, you must return the HS to the distributor for servicing.***

- **Current Cal Factor Not Valid**
- **Cal Factor too Low**
- **Cal Factor too High**
- **Calibration Out of Range**
- **Inconsistent Calibration**
- **Baseline Rise Error**
- **Unknown Error**
- **Fuel Cell Temperature Error**
- **Blow Tube Temperature Error**
- **Pump Temperature Error**
- **Piston Fired: Active Error**
- **Piston Fired: Rest Error**
- **Piston Not Fired: Active Error**
- **Piston Not Fired: Rest Error**

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IRM-ENG- 60-000337-A