

Idaho State Police Forensic Services

Approval for Quality System Controlled Documents



Discipline/Name of Document: Breath Alcohol
Idaho Intox 5000 Series Reference Manual

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APPROVED BY:


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Checklist Submitted and Checked NA

Idaho

INTOXILYZER 5000 Series

Reference Manual



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History Page

Revision #	Effective date	History
	8/1/1999	New Manual (original issue)
0	8/20/2010	New formatting and procedural language

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Scope:

Idaho State Police (ISP) has authority and responsibility in the state of Idaho for the calibration and certification of instruments, maintenance of instrumentation, quality control guidelines, and analytical methods pertaining to the evidentiary collection of breath alcohol samples. Idaho State Police Forensic Services (ISPFS) is the functional unit within ISP that is authorized to administer the Breath Alcohol Testing Program.

Analytical Methods (AM), also known as Standard Operating Procedures (SOP), shall supersede and take legal precedent over any and all other forms of documentation (e.g. reference manuals, training manuals, and training materials) produced or maintained by the Idaho State Police as it pertains to the Breath Alcohol Testing Program in the state of Idaho. If discrepancies exist between differing forms of procedural documentation, the Analytical Method shall be the binding document.

The reference manuals produced and maintained by ISPFS are for reference only as it pertains to the form and function of the different breath alcohol testing instruments used within the state of Idaho. If questions arise as to the functionality of the instrument, the reference manual may be used to help answer those questions. The reference manual is a reference tool used by the end user agency to help the Breath Testing Specialists and Operators maintain knowledge as to the functionality of the instrument and to refresh their memories as to the different functions and options within the different instruments.

Breath Testing Specialists Responsibilities:

The Breath Testing Specialist (BTS) should have a good knowledge of the Breath Alcohol Program and the operation of the Intoxilyzer 5000 Series. It will be the responsibility of the BTS to oversee the Breath Alcohol Program within his/her agency.

The BTS will be responsible for:

- a) Record management and retention
- b) Maintenance and functioning of the instrument
- c) Maintenance and functioning of the simulator
- d) Teaching and certifying operators in the proper use of the Intoxilyzer 5000 Series
- e) Testifying in court to your responsibilities and duties

This reference manual is designed to assist the BTS in their duties. However, if at any time questions arise, call the lab that has jurisdiction over your area (see [ISPFS Website](#)).

COEUR d'ALENE LAB
615 W Wilbur Ave, Suite B
Coeur d'Alene, Id 83815

PHONE NUMBER: 209-8700
FAX NUMBER: 209-8612

POCATELLO LAB
209 E. Lewis
Pocatello, Id 83201

PHONE NUMBER: 232-9474
FAX NUMBER: 232-3697

MERIDIAN LAB
700 S. Stratford Drive Suite 125
Meridian, Id 83642

PHONE NUMBER: 884-7170
FAX NUMBER: 884-7197

Safety:

Chemicals, reagents, and solutions used within the scope of the breath testing program should be handled with caution to avoid loss, spillage, contamination, and damage of the instrumentation. When any electrical instrument is used around and in conjunction with liquid solutions and reagents, extreme caution should be taken to avoid damage due to short circuits and injury due to electrical shock.

Officers should be aware that pertinent safety information may exist in an instrument operation manual or in the Material Safety Data Sheet (MSDS) for a chemical, reagent, or solution.

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INTOXILYZER 5000 Series

SUGGESTED PERFORMANCE VERIFICATION PROCEDURES:

The Intoxilyzer 5000 has different performance verification options which can be controlled by its switch settings. **It is required to perform a performance verification with each evidentiary breath test.** Listed below are the instructions for setting up the Intoxilyzer 5000 to perform a performance verification, as well as the instructions to perform other types of checks. These other types of checks may be used during periodic maintenance as deemed necessary.

Recommended procedure for setting up the Intoxilyzer 5000 to perform a performance verification with each breath test

1. Pour the performance verification solution into the simulator, plug it in, and allow the solution to warm for approximately 15 minutes to the proper temperature.

WARNING: The simulator must contain liquid when it is plugged into an electrical outlet or the simulator will burn out.

2. Connect the simulator to the Intoxilyzer 5000. The "vapor out" port of the simulator should be connected to the "vapor from simulator" port on the **right side** (not rear) of the Intoxilyzer. **If the simulator is incorrectly connected, the 5000 may be flooded and put out of service.**
3. To utilize vapor recirculation connect the "simulator return" port on the right **rear** of the Intoxilyzer 5000 to the simulator breath inlet.
4. Set mode switches 1,2,3 and 11 on (up).
5. Use <Escape> <Escape> <X> on the keyboard.
6. Answer **all** of the following questions and press enter/return to store the information. **It is critical that the following parameters be entered correctly. Failure to enter any of these parameters correctly may result in the unnecessary disapproval of the breath test(s) performed.**
 - a. Low Ref Value: This is the lowest acceptable value that will still be considered as valid for a performance verification check. This number must be entered as 4 digits (e.g. 0.070). This value will be obtained from the Certificate of Analysis for each lot.
 - b. High Ref Value: This is the highest acceptable value that will still be considered as valid for a performance verification check. This number must be entered as 4 digits (e.g. 0.090). This value will be obtained from the Certificate of Analysis for each lot.
 - c. Reset Count Y/N/V: This allows you to reset the counter. The counter increases by one every time the simulator solution is analyzed by the instrument. (Y) resets the counter, (N) does not reset the counter, and (V) lets you view the counter.
 - d. Solution Lot #: This entry is for the solution lot number. This entry requires ten alphanumeric characters (i.e. Lot # 98801 must be entered as 0000098801).
7. The instrument is now set to perform a performance verification check with each breath test.

Recommended procedure for performing a performance verification via the simulator port

1. Set mode switches 1,2,3,4,5 and 11 on (up). Switch 4 puts the instrument in the three-digit mode used for performance verification checks, or on the 5000EN, Use <Escape> <Escape> <W> on the keyboard and answer yes to "3 DIGITS ON?" and "PRELIM RES?"
2. Use <Escape> <Escape> <C> on the keyboard to begin the sequence. The instrument will run the solution twice and printout the results.
3. If the performance verification check does not produce valid results follow the trouble shooting guide in the analytical method/standard operating procedure.
4. Retain a record of the results.

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Recommended procedure for performing a performance verification via the breath tube

1. Set mode switches 1,2,3,4,5 and 11 on (up). Switch 4 puts the instrument in the three-digit mode used for performance verification checks, or on the 5000EN, Use <Escape> <Escape> <W> on the keyboard and answer yes to "3 DIGITS ON?" and "PRELIM RES?"
2. With the simulator unhooked from the instrument use <Escape> <Escape> on the keyboard to begin the sequence.

Warning: Do not have the simulator hooked up to the breath tube during an air blank. The sucking action may pull the solution into the instrument and the Intoxilyzer 5000 may be flooded and put out of service.

3. Follow the instructions on the display:
 - a) Insert a card if and external printer is not being used.
 - b) Enter your last name (up to 20 letters)
 - c) Enter your first name (up to 20 letters)
 - d) Enter your middle initial
 - e) Enter your ID Number (number w/o dashes)
 - f) Enter the solution 1 or 2 (1a, 1b, or 2)
 - g) Review data Y/N (Yes starts you back at step (2), No continues on with the performance verification check.)

NOTE: The solution number referred to in 'f' above is not important at this time. Its purpose is to distinguish which solution is run through the breath tube when more than one solution is used to perform this type of performance verification check.

4. The instrument will obtain an air blank.
5. The message "Please blow/R into mouthpiece until tone stops" will scroll across the display and then "Please Blow/R" will flash on the display. At this point attach the breathtube to the vapor out port of the simulator and blow into the mouthpiece for approximately five seconds.
6. Unhook the simulator from the breath hose immediately following the displayed readout, displayed as subject test .###.
7. Repeat steps 2-4.
8. Retain a record of the results.

Proper Connection of the Simulator

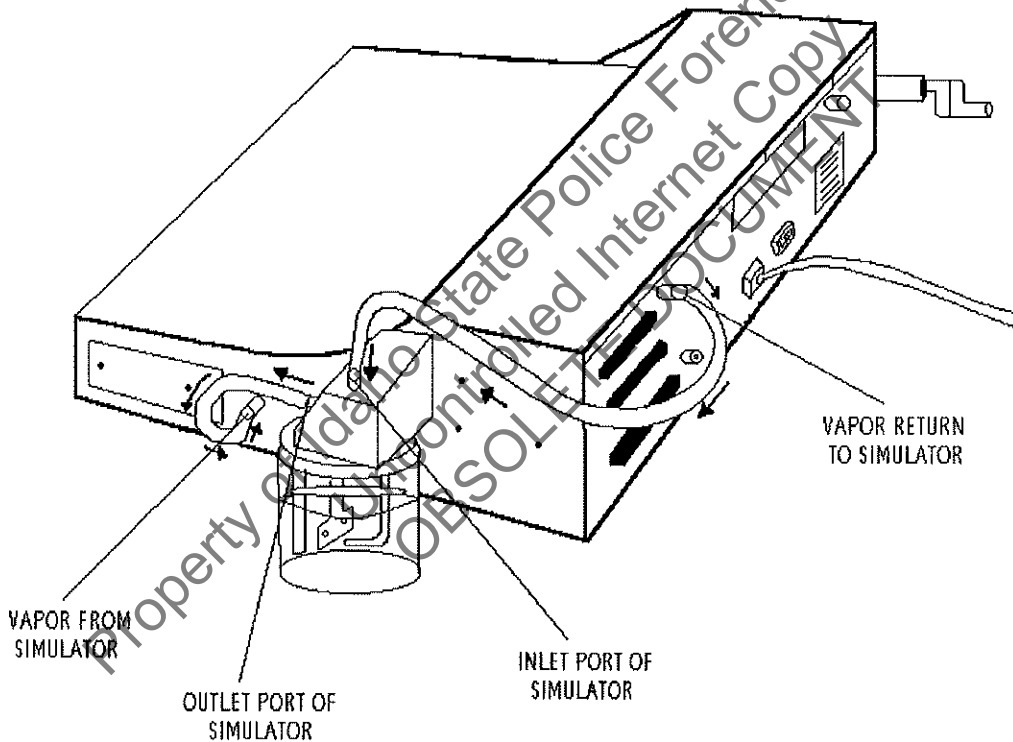
The proper connection of the simulator is important. If the simulator is not connected properly, the Intoxilyzer 5000 series may draw solution into the chamber and flood the instrument.

To properly connect the simulator to the Intoxilyzer 5000 series attach a 1/4 inch (inside diameter) piece of tubing from the vapor out port on the simulator to the simulator vapor port on the side of the Intoxilyzer 5000 series. Use the shortest section of tubing possible.

Next, connect another 1/4 inch piece of tubing from the right rear of the Intoxilyzer 5000 series, labeled simulator return on the instrument, to the vapor in port on the simulator.

Do not connect the inlet port of the simulator to the port on the left rear of the instrument labeled pump EXHAUST/SAMPLE CAPTURE and BREATH EXHAUST.

The diagram below illustrates the proper hookup with a Guth or a Mark IIA simulator.



KEYBOARD OPTIONS MENU

Diagnostic and set up functions can be accomplished through the Keyboard Options Menu, commonly known as the Escape Escape Sequence. The Intoxilyzer 5000EN does not have switches to control functions like the previous Intoxilyzer 5000. All of the functions are controlled through the keyboard options menu.

To enter the Keyboard Options Menu, press the ESC key twice in rapid succession. It may take a few attempts to get the instrument to recognize the ESC ESC command. The timing is critical for this keystroke. This was done deliberately to help prevent an unauthorized operator from inadvertently activating the menu.

Keyboard Options Menu

Press the ESC button twice very quickly to view the keyboard options menu. To make a selection from the menu, press the associated letter followed by the ENTER key.

Display: Menu #1: 1 B,C,D,E,G,H,P,V,W,Q

Menu #2: 2 A,I,J,K,M,S,U,X,Q

ON THE FIRST MENU:

1

B = Maintenance Check

C = Performance Verification Check

D = Diagnostic

E = Preliminary Data Entry

G = Calibration Standard

H = DVM Mode

P = Print Test

V = Version Display

W = Instrument Function Setup

ON THE SECOND MENU:

2

A = Continuous Air Blank

I = Internal Standards

J = Memory Full Check

K = Flow Rate Calibration and Testing

M = Communications Select

S = Motor Speed

U = Cell Temperature Setup Function

X = Solution Setup Function

Q = Quit Menu

ESCAPE ESCAPE MENU FUNCTIONS

- A** Auto Purge. This function is used to purge the chamber of any vapor or fluid that may enter the instrument.
- B** Performance verification check via the breath hose. See the suggested procedure for performing a check through the breath hose.
- C** Performance verification performed via the simulator port. See the suggested procedure for performing a check through the simulator port.
- D** Will perform diagnostic check.
- E** Preliminary Data Entry Allows you to edit the time, date, location of the instrument and to select the question asked at the end of the testing sequence. For instruments with external printers, you are able to select the number of copies of the breath test results to be printed. As each prompt appears there are two courses of action. Either type in the new data or press ENTER when the proper data is on the display to store it in memory.

Note: While performing a breath test a series of questions is asked of the operator. If the operator answers yes to the question "DUI arrest Y/N", a second question will be asked immediately following the breath test.

"ENTER TIME HHMM" (Set time using 24 hour clock)

"NORM TIME ZONE =" (example MST)

"Date = MMDDYYYY" (Set date)

"INSTR LOCATION =" (Set location)

"H FOR HELP (1,2,3)" (This option sets the question asked at the end of subject test if the operator answers yes to the question

"DUI ARREST Y/N". 1 = DECP Y/N

2 = DRUG TEST Y/N

3 = NONE

In Idaho choose selection 2.

"NUM COPIES (1-3)" (This option is for the use of external printers and can be set to print form 1-3 copies. For internal printers choose 1.)

"TIMEOUT IN MIN =" (This number determines how many minutes of inactivity are necessary before the instrument goes into STANDBY MODE. An entry of ZERO (0) will force the instrument to always stay on. The allowable range of time for this option is 1 to 255 minutes. The simulator is not programmed to go into

STANDBY MODE and will stay on any time there is power to the instrument.)

G Barometric Menu This option allows you to choose between wet bath and dry gas calibration. Dry gas is not being used in the State of Idaho. Instrument prompts “SELECT, MAINT (S,M)”

“S” – Select

The instrument will prompt “TYPE GAS, WET (G,W)”

“G” -Dry Gas

“W” -Wet Bath

“M” -Maintenance

The instrument will prompt “DISP,CAL,PNT (D,C,P)”

“D” -Display the current barometric pressure

“P” -Print the current barometric calibration

“C” -Instrument prompts to “ENTER BAROMETRIC” to perform one point calibration on the barometric sensor.

“Q” -Quit

Note: The Maintenance options are not needed. We are only using the wet bath performance verification check.

H DVM Test: This is a special diagnostic tool to help a technician check the instrument for drift and stability.

In this mode, the processor output from each of the five filters appears one at a time on the display. The display will show the output YY X VVVV NNNN where:

- YY--indicates which mode the instrument is in.

CH indicates DVM mode

IN indicates internal standards

- X--is the channel number
- VVVV--is the value of the channel
- NNNN--is the noise figure for the channel

The value displayed is the value from the analog to digital converter. The noise figure gives a representation of performance of the channel. The noise figure is the difference between the maximum and minimum of 30 individual samples. Noise figures above 60 will fail the stability tests.

- I** Internal Standards This option allows you to check the instrument's internal standard values. The value of each of the five internal standards is printed individually on the card.
- J** Memory Full Check When the memory full option is active (Y), the instrument will warn the operator when the memory is almost full and disable the instrument if the memory becomes full. This would allow for a communications download of the data without losing any data. When this option is not active (N), the instrument will still record the test records as before. However, when the instrument is out of space, it will begin to delete the oldest record to make room for the newest entry. Until we are downloading information on a regular basis, leave this option turned off (N).
- K** Flow Rate Calibration and Testing This option allows the technician to monitor volume and flow measurements. If you choose this option, press the START TEST button to exit.
- M** Communication Select This option allows you to choose the communication interface with the instrument. It will prompt "MODEM OR DIRECT". Select "M" for modem so that ISPFS can contact the instrument.
- P** Will perform a print test
- V** Will display the version of the software you are currently using.
- X** Allows you to set the parameters for performing a performance verification check with each breath test. For more information see the procedure on performing a performance verification with each breath test (Page 6).

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W Custom Function Setup. This option replaces the switch settings that were on the previous Intoxilyzer 5000. The function of the instrument is controlled by answering a series of eleven questions.

- **“STD TEST (1-5)?”** The Intoxilyzer 5000EN is capable of running five different breath test sequences. **For evidentiary DUI testing use choose sequence 1, which is the custom sequence for the State of Idaho.**
 1. Custom test (AIACABABA)
 2. ABA
 3. ABACA
 4. ACABA
 5. ABABA
- **“CUSTOM TEST? Y/N”** The instrument will confirm the test sequence you want to use. Type Y or N.
- **“3 DIGITS ON? Y/N”** This question is asking how many digits the alcohol concentration should be displayed in. **For evidentiary use, we recommend this option be turned on (Y)**, this will print three digits past the decimal point (.000). When you use the keyboard options to do a performance verification check, this should be turned on to print all three digits (.000).
- **“PRELIM RES? Y/N”** This allows you to see the alcohol concentration throughout the entire test, not just the final result. The display will continually show the rising, falling or constant concentration value of the sample as the subject blows. **For evidentiary testing this should be turned off (N)**, so only the final result is displayed.
- **“DATA ENTRY? Y/N”** The instrument is programmed with a set of data entry questions that may be asked before each breath test begins. These questions include the subject’s name and operator’s name. **For evidentiary testing turn this option on (Y).**

Note: Only when data entry is turned on will test results be stored on the battery protected memory.

- **“PRINT INHIB? Y/N”** It is possible to inhibit the printer from creating a printed record of the breath test. Choose “Y” if you do NOT want the instrument to print a test record. Choose “N” if you DO want the instrument to print a test record. **For evidentiary testing this should be turned off (N)** so that a test record is printed. If a record is not printed use the function key F1 on the keyboard to reprint the results of the last test.
- **“INT STDS? Y/N”** This option performs an internal standards check **in place of the performance verification check**. For evidentiary testing this needs to be turned off (N) so that a performance verification check is run during the test sequence.
- **“PRINT VOLUME? Y/N”** The expired breath volume can be printed with each breath test. **For evidentiary testing this should be turned off (N)**. We are not currently using this feature.
- **“AUTO TEMP CK? Y/N”** Allows the instrument to obtain temperature information from a compatible Guth simulator automatically. “SIMULATOR TEMPERATURE IN RANGE” will print on the report. **For evidentiary testing this should be turned on (Y) if possible**. If a compatible simulator is not being used or this feature is for some reason not functioning it can be turned off. If it is turned off (N), the question “SIM IN RANGE Y/N” will be asked before each performance verification check.
- **“REVIEW SETUP? Y/N”** If you are satisfied with the setup, choose “N”. If you would like to double-check your entries, choose “Y”.
- **“SAVE SETUP? Y/N”** Answering “Y” to this question will save your new configuration onto the battery backup RAM. This will preserve the configuration so that each time that the instrument is energized, it will be set to your new configuration.

RECOMMENDED INSTRUMENT SETUP FOR EVIDENTIARY TESTING

<u>QUESTION</u>	<u>RESPONSE</u>
"STD TEST (1-5)?"	1
"CUSTOM TEST? Y/N"	Y
"3 DIGITS ON? Y/N"	Y
"PRELIM RES? Y/N"	N
"DATA ENTRY? Y/N"	Y
"PRINT INHIB? Y/N"	N
"INT STDS? Y/N"	N
"PRINT VOLUME? Y/N"	N
"AUTO TEMP CK? Y/N"	Y

Q Quits the <Escape> <Escape> functions and takes the Intoxilyzer back to its resting display.

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SWITCH SETTINGS for the INTOX 5000 66 Series

<u>Switch Number</u>	<u>Function</u>	<u>Off Position</u>
1	Display test	Down
2	D.V.M. test	Down
3	Used with switch I & 2 to set mode	
4	Displays 4 digits	Down
5	Displays readout during breath test/cal check	Down
6	Not used in Idaho	
7	Runs the Internal Standards	Down
8	Not used	
9	Will perform a performance verification check	Down
10	Not used in Idaho	Down
11	Use keyboard to input data for the question series	Down
12	Not used in Idaho	Down
13	Disables the printer	Down
14	Not used in Idaho	Not Applicable
15	Not used in Idaho	Not Applicable

Useful switch settings

Action

1,2,3,4,7,9 & 11 up

Will perform a check on the internal standards when the green START BUTTON is pushed.

2, 7 up

Enters D.V.M. mode. Press the green START BUTTON and to scroll through D.V.M., Internal Standard # 1, Internal Standard #2, and Internal Standard # 3 values.

1,2,3,4,13 up & 11 down

Will allow an operator to perform a subject test by pressing the START BUTTON. However, no information will be keyed in and a printout will not be obtained. Great for public service, or public awareness.

1,2,3,7,11 & 13 up

In the event of printer failure this switch setting may be used until a loaner instrument is obtained. No print card will be issued so it is essential that operators record all information in the instrument log.

Useful switch settings

1,2,3 down

Action

Activates a printer test when the green START BUTTON is pushed.

1,2,3(4) & 11 up

This is the recommended setting used at this time for evidentiary testing. Use switch 4 to display 3 digits

1 up

Display test. All characters will scroll across the display.

1,2,3,4,5 & 9 up

Will perform a performance verification check by pressing the green "START BUTTON". Use this if your keyboard goes out to perform a performance verification check.

1,2,3,4,5 & 13 up

No printout will be obtained and no Information will be entered. This setting is useful for demonstrations.

If a switch is not mentioned then it is assumed to be in the off position. For other mode settings see the operating manual for the Intoxilyzer 5000 that is published by CMI or call the local Forensic Lab.

INSTRUMENT MESSAGES

Here are other instrument messages in addition to those found in the operator training manual that you should know about.

MESSAGE

"DVM *23"

SOLUTION

This means your IR source is bad or failing. Changing the IR source, if you have the knowledge to do this, will solve the problem.

"INVALID MODE"

The switches on the right side of the instrument are set improperly. Setting them correctly will solve the problem.

"INVALID LOT NO"

Re-enter the lot number, taking care to enter ten alphanumeric characters. (e.g. Lot # 9801 must be entered as 0000009801).

SIMULATORS

CARE

1. **Do not plug the simulator in without liquid. The heater bar will burn out rapidly in air.**
2. After using the simulator allow it to air dry at least 24 hours before screwing the top onto the jar. This will help to prevent the formation of rust.

USE

1. To use your wet bath simulator:
 - a) Pour solution into the simulator and plug it in.
 - b) Allow solution to warm to operating temperature (approximately 15 minutes).
 - c) Observe the temperature
 - d) If the simulator still is not within the suggested range, see trouble shooting in the analytical method/standard operating procedure.

HANDLING OF PERFORMANCE VERIFICATION CHECK SOLUTIONS

1. Leave the solution in the simulator. Pouring the solution back and forth depletes the ethanol concentration. If storage of solution is required, let the simulator completely cool before removing the solution.
2. Store the performance verification check solutions tightly capped in a cool place out of direct sun light.
3. Add enough solution to the simulator jar to cover the propeller while still maintaining a level below the baffle.
4. **Ordering of solutions should be done by the Breath Testing Specialist.** If you need assistance call your local lab.
5. When changing out simulator solutions it is a good idea to perform a performance verification check with the new solution. This ensures that everything is setup and functioning properly for your operators.

INTOXILYZER 5000 GENERAL MAINTENANCE AND REPAIRS

1. When doing maintenance and repairs on your instrument it is a good idea to do a performance verification check before and after to help prevent arguments that may arise.
2. Keep records of all maintenance and repairs performed.
3. Turn off or unplug the instrument depending on the type of maintenance or repair you are performing.

MAINTENANCE

1. Nothing is to be stored on top of the Intoxilyzer.
2. Do not set cups of liquid on the instrument. A simple spill could leak onto the computer boards and cause shorts.
3. Try to keep the outer case clean. Use a glass cleaner such as 409 or other non-abrasive cleaner. Spray onto a cloth and wipe the case with the cloth. Do not spray directly onto the case (see #2).
4. Keep the area under and around the case free from dust and dirt.
5. Keep the area around the instrument free from volatile compounds. The presence of such chemicals could cause **AMBIENT FAILED** on the display.
6. Avoid sudden temperature fluctuations (a heat/air conditioning duct), or instrument may display **AMBIENT FAILED**.
7. The instrument has a built-in spike protector, but purchase of a surge protector may be useful in those areas which are often hit by these electrical surges.
8. **FILTER WHEEL DUST PROTECTOR**: Lay protective tape over the opening above the filter wheel.
9. Protect the plastic insert (coupler) in the end of the breath tube from loss and breakage.
10. Clean air intake screens at the base of the breath tube connection as needed.
11. Lube printer bar with silicone spray regularly. Do this by spraying the lubricant on a Q-tip or cloth then apply it on the bar. **Never spray lubricants directly into the Instrument.**
12. Use canned air obtained from your local hardware or electronics shop to blow out dust and debris that collect inside your instrument. Cleaning the chopper motor can cut down on unstable reference errors if your instrument is located in a dusty location.

IMPORTANT: Turn off the instrument and let the IR source cool down before blowing out the instrument.

Try to clean the inside of the instrument several times a year, especially the fan and screen on the bottom of the instrument.

The instrument is very sensitive to the canned air chemicals and it may be necessary to ventilate the area well before starting any testing or an **AMBIENT FAILED** error message may be displayed.

13. When removing the black cover from the right side of the instrument make sure the 40 volt capacitors still have the paper covers on their ends. If they do not, glue them back down with a GLUE STICK, or cover them with electrical tape.

CAUTION: Potential electrical hazard. Unplug the instrument first.

REPAIRS

- These instruments have a two (2) year warranty and repairs will generally be done at CMI. There are other approved vendors.
- Additional training for repairs can be obtained by attending the Intoxilyzer 5000 Users Group or a one-week training course at the factory.

Here are some of the places that do repairs on the Intoxilyzer 5000. This is not an inclusive list.

CMI, Inc.
316 E. 9th Street
Owensboro, KY 42303
Phone: 1-866-835-0690

Applied Electronics
52 Juniper Lane
Eagle, CO 81631
Phone: 1-970-328-5420

COBRA

The Idaho State Police Forensic Services terminated the COBRA program in July 2010. The COBRA technology was antiquated and not functional with VoIP phone systems. ISPFs requests that "last drink" information still be provided to the Idaho State Police Alcohol Beverage Control Bureau.

OPERATOR CLASS

1. There is no specific requirement for the length of the class as long as everything is covered, and students can pass a practical and written exam.
2. Must cover complete lesson plan for new operator class or operators whose certification has expired.
3. Do not let the operator take the test until the entire class has been taught.
4. Class materials can be copied from masters found in section three. Each student needs one copy of the SOP, and the Reference Manual.
5. Obtain certification card templates from the lab that has jurisdiction over your area.
6. **Send roster to POST.**
7. Keep a copy of the POST roster for your record. These should be maintained at least 3 years and are subject to audit by the Idaho State Police Forensic Services.
8. Grade the tests. **Do not let your students grade the test as you may need to testify to the certification of your students.**
9. Each student must successfully complete the written exam with 80% or better.
10. Issue the card to any student who successfully completes the class. Sign your name on the line that says "BTS signature". Expiration date is the last day of the 26th month from the day the class was taken.
11. Important things to teach in class:
12. It is a good idea to ask if subject has anything in mouth prior to the start of 15-minute waiting period.
13. The purpose and importance of the 15-minute waiting period.
14. Have officer maintain complete control over breath tube at all times.
15. Use new mouthpiece for each subject.
16. Log the results immediately after completing the test.
17. Always check for proper insertion of printcard before starting test.
18. Always check the date and time for correctness before starting test.
19. If anything unusual occurs prior to or during the test, the officer should make note of it on the alcohol influence report form or other place. For example: uncooperative subject.
20. Obtaining a sample if the Intoxilyzer 5000 won't let you perform a breath test.

Special problems:

- a) **DEFICIENT SAMPLE**-does not meet breath sample requirements.
- b) **INVALID SAMPLE**- mouth alcohol.
- c) **IMPROPER SAMPLE**- blew at wrong time.

d) **INTERFERENT** - intoxicating substance other than alcohol. Get a blood sample.

21. Printcards:

- a) Recommend officers sign cards.
- b) Should fill in Time First Observed with starting time of 15-minute observation period.

22. Check the temperature of the simulator. If it is in range place a check in the appropriate column of the instrument log.

23. Position yourself so you are in front of the instrument and in control of breath tube. This will position the subject at the front left of the instrument which will help protect the simulator at the right rear.

NOTE: Some agencies leave the suspect in handcuffs while performing the breath test.

ORDERING INFORMATION

Below are a number of places where you can get parts and accessories for the Intoxilyzer 5000 series.

This list is not inclusive.

-Guth	1-800-233-2338
-BesTest, Inc.	1-800-248-3244
-CMI	1-866-835-0690
-Applied Electronics	1-970-328-5420
-REPCO	1-919-876-5480
-National Draeger, Inc.	1-800-385-8666

INTERNAL PARTS AND THEORY

This information is very general. Its purpose is to enhance your understanding of the performance and function of the instrument.

Depending on their physical size and structure, molecules absorb energy of specific frequencies. For example, alcohol molecules absorb certain frequencies of infrared energy. Accordingly, the Intoxilyzer 5000 breath analysis instrument uses an infrared energy absorption technique to find the alcohol concentration of a breath sample.

The heart of the Intoxilyzer 5000 instrument is its sample chamber. At one end of the chamber, a quartz iodide lamp emits infrared energy, which is directed through the chamber by a lens. At the opposite end of the chamber, a second lens focuses the energy leaving the chamber through three rotating filters and onto an infrared energy detector. These filters only allow certain wavelengths through.

Initially, the instrument establishes a zero reference point by measuring the amount of infrared energy striking the detector when the sample chamber is filled with room air. During a breath test, as the amount of alcohol vapor in the chamber rises, the amount of infrared energy reaching the detector falls. Therefore, by finding the difference between the zero reference point and the breath test measurement, the instrument can determine breath alcohol concentration. The unit displays the result in grams of alcohol per 210 liters. To assure accurate test results, the Intoxilyzer 5000 breath analysis instrument also checks to see that other substances that may interfere with the breath tests accuracy are not present.

A. Filter Wheel (Intoxilyzer 5000 Model)

Three filters are embedded in the filter wheel. The Intoxilyzer 5000 uses these to measure alcohol concentration and detect interfering substances.

1. 3.48 Measures the concentration of alcohol and is set at 6.00 volts.
 - 3.80 Is used as a reference and is set at approximately at 6.00 volts.
 - 3.39 Looks for interferents and is set individually for each instrument around 4.00 volts.
 - a. In normal alcohol-only situation, a ratio exists between 3.39 and 3.48 peaks.
 - b. With the presence of acetone, 3.39 peak gets higher and ratio changes.
 - c. The Intoxilyzer 5000 series may electronically correct the ratio and subtract the interfering substance.
 - d. Not all substances are subtracted accurately. For this reason it is important to obtain a blood sample when an interferent is detected.
 - e. Intoxilyzer 5000 is not specific for ethyl alcohol.
2. Timing notch on the wheel keeps the computer in sync to filters.
3. Rotates at 1800 rpm. At this rate a sample is analyzed approximately 30 times per second.

B. Internal standards

- Checks the functioning of the instrument by monitoring the voltages produced by the three filter wheel.
 1. 3.39 is 0.100 standard.
 2. 3.48 is 0.200 standard.
 3. 3.80 is 0.300 standard.
 4. With the filter wheel moving at 1800 rpm each internal standard is checked approximately 30 times a second.
 5. Internal standards are directly linked to the established voltages and calibration setting of the instrument.
 6. Any shift or change in voltages or calibration setting will be reflected in the Internal Standards.
 7. If one or more of the internal standards are outside a 5% allowable tolerance the Intoxilyzer will abort the test with INTERNAL FAILED.
 - a. .100 std range is .095 to .105.
 - b. .200 std range is .190 to .210.
 - c. .300 std range is .285 to .315.

C. Interferent detector

Detects interfering substances that may be present in a sample.

1. It is capable of doing this because of the analysis of multiple wavelengths
2. Performed by the instrument.
3. Comparison of 3.48 and 3.39 channels will cause automatic subtraction for performing a correction of the result

Note: In order to have the acetone subtraction option active, the instrument needed to have been setup for acetone subtraction during the calibration sequence.
4. With lower levels of acetone, subtraction is automatically done without any signal.
5. With higher levels of acetone and other interfering substances, Intoxilyzer will signal INTERFERENT on display.
6. Print card will also say "INTERFERENT DETECTED HAVE BLOOD DRAWN".

D. **Mouth alcohol detector**

This is accomplished by the analysis of a slope detector.

1. To be an acceptable alcohol reading, must have a positive slope.
2. Mouth alcohol has a negative slope.
3. Intoxilyzer 5000 performs a continuous comparison of the breath sample. The BrAC values must continue to climb, producing a positive slope. If the BrAC values of a sample are decreasing, producing a negative slope, the test is aborted with the printout "INVALID SAMPLE" (i.e. mouth alcohol contamination). Also present on the printout is the statement "REPEAT OBSERVATION PERIOD BEFORE RETESTING SUBJECT".
4. Operator should find the cause of problem, if possible, and start 15-minute waiting period over again.

E. **Sample chamber**

The sample chamber is where the initial analysis of the sample takes place.

1. It is the long tube located at the rear of the instrument.
2. Chamber size is 81 cubic centimeters in volume.
3. Fresnel lens on each end of chamber.
4. Light source located to the right.
5. Chopper motor and filter wheel located to the left.

F. **Light Source**

The light source is a tungsten filament halogen light bulb with one side coated with silver.

1. Emits all wavelengths of light.
2. Is "ON" all the time unless Intoxilyzer 5000 is turned "OFF".
3. Life span of 2000-3000 hours per bulb.
4. Light is directed through chamber by lens.

G. **Detector**

Detects the intensity of light.

1. Detects the bands of infrared light that pass through the filters.

H. Breath sampling mechanism

1. Flow through technology.
2. Pressure switch in breath line (approximately 2" water).
 - a. As breath is forced into the instrument, the switch is forced open.
 - b. Must be held open continuously for 5 seconds.
 - c. Tone starts as soon as pressure is reached.
3. Intoxilyzer 5000 starts analysis immediately, but doesn't give a result until a valid sample is obtained or the 3-minute time allowance has passed.
4. The Intoxilyzer 5000 also has a slope detector:
 - a. Monitors change in alcohol concentration with time.
 - b. Increase in alcohol must not be greater than .003/second for sample to be accepted as valid.
 - c. Intoxilyzer 5000 does 30 analyses on the breath sample each second.
5. The tone indicates that the subject is blowing and the pressure switch is open.
6. All breath lines and sample chamber are kept small so that any breath found in the chamber after 4-5 seconds is breath that was recently blown in.
7. Earlier breath has been forced out of the chamber.
8. Average lung capacity is about 4 liters. When a person finally runs out of breath, about 2.5 to 3 liters of breath has been expelled.
9. If the subject stops blowing before the pressure and slope requirements have been met, the Intoxilyzer will beep every 5 seconds for 3 minutes at which time it will end the test and print "DEFICIENT SAMPLE" on the printcard.
10. Breath must be one long, continuous sample or it will not be accepted.
11. Breath line is heated to 105 to 110 °F to prevent water condensation.
12. The agreement of two separate breath samples strongly refutes the possibility of an instrument malfunction, radio frequency interference, mouth alcohol, or other possible sources of error (see SOP III).

I. Processor Components

1. RAM chip is a random access memory chip, which stores the memory of tests, performance verification checks and instrument internal checks.
 - a. Needs constant source of power to maintain its memory.
 - b. Ram board has a rechargeable battery which will hold the memory for 6-7 weeks.
2. EPROM chips are Erasable Programmable Read Only Memory chips that are programmed at the factory and contain the permanent memory of the instrument such as serial number and the question series program.
 - a. There are three EPROMs that work as a set.
 - b. EPROMs do not need a constant current to maintain memory.

J. Internal Printer

1. Impact printer, no ribbon.
2. Needs NCR paper for the print cards.

K. Three-way valves

There are two of these valves which channel samples.

1. One directs the flow from either the breath tube or the simulator port through to the sample chamber.
2. The other allows for simulator recirculation.

L. Radio frequency detector

1. Antenna wire is wrapped around breath tube.
2. Detector is internal, located on the CPU board.
3. Entire Intoxilyzer 5000 is a FARADAY CAGE, completely grounded and all openings screened.
4. Although RFI cannot affect the readings, any RFI emissions picked up by the external antenna will cause the instrument to report RFI DETECTED and stop the test.
5. Demonstrate RH with a hand-held radio.

INTERNAL PARTS AND THEORY UNIQUE TO THE 5000EN

This is information that is unique to the Intoxilyzer 5000EN in relation to the previous Intoxilyzer 5000.

A. Filter Wheel (Intoxilyzer 5000EN Model)

The Intoxilyzer 5000EN has five filters embedded in the filter wheel. It uses these filters to measure alcohol concentration and to detect interfering substances.

1. 3.47 Measures the concentration of alcohol.
- 3.80 Is used as a reference.
- 3.40, 3.36, and 3.52 Look for interfering substances. Make the instrument more specific to ethanol.
 - a. In a normal alcohol-only situation, a ratio exists between the 3.40 and 3.47 peaks.
 - b. With the presence of acetone, 3.40 peak gets higher and ratio changes.
 - c. Intoxilyzer 5000 series electronically corrects the ratio and subtracts the interfering substance.
 - d. **Not all substances are subtracted accurately. For this reason it is important to obtain a blood sample when an interferent is detected.**
 - e. Unlike the previous Intoxilyzer 5000, the Intoxilyzer 5000EN is able to detect other types of alcohol as interferents. For example this instrument will respond "INTERFERENT DETECTED" in the presence of methanol and isopropanol.
2. Timing notch on the filter wheel keeps the computer in sync to filters.

B. Internal standards

Checks the functioning of the instrument by monitoring the voltages produced by the five filters on the filter wheel.

1. 3.40 is .100 standard.
2. 3.47 is .200 standard.
3. 3.80 is .300 standard.
4. 3.36 is .400 standard.
5. 3.52 is .500 standard.
6. Internal standards are directly linked to the established voltages and calibration setting of the instrument.
7. Any shift or change in voltages or calibration setting will be reflected in the Internal Standards.

8. If one or more of the internal standards are outside a 5% allowable tolerance, the Intoxilyzer will abort the test with INTERNAL FAILED.

- a. .100 STD range is .095 to .105.
- b. .200 STD range is .190 to .210.
- c. .300 STD range is .285 to .315.
- d. .400 STD range is .380 to .420.
- e. .500 STD range is .475 to .525.

C. Printer

1. The internal printer is an impact printer, no ribbon.
2. Needs NCR paper for the print cards.
3. The Intoxilyzer 5000EN is equipped with a connection for an external printer. The internal printer is automatically disabled when an external printer is connected to the instrument.

D. Flow Sensor

The pressure switch in the previous Intoxilyzer has been replaced by a flow sensor.

1. There are four minimum requirements that must be met before a sample will be taken.
 - a. 1.1 Liters of air must be expired.
 - b. The subject must blow for a minimum of one second.
 - c. The alcohol concentration slope must level off.
 - d. The pressure must reach approximately 1" of water.

E. Standby Mode

The Standby Mode allows the Intoxilyzer 5000EN to be used with a short warm-up time and results in less wear on the instrument than being left running continuously.

1. In the Standby Mode, power is applied only to the heaters in the instrument.
2. When a cold Intoxilyzer is turned on, the instrument will take 30 minutes to warm up to the proper operating temperature before it begins diagnostics and moves into the IDLE MODE. When the instrument is reactivated from the Standby Mode, it only will need two minutes to warm up.
3. To reactivate the instrument from the Standby Mode you only need to press the START TEST button.
4. The Standby Mode can be easily noted because the display will be blank and the red power light will still be lit.
5. The amount of time allowed before the instrument "times out" is controlled through the "ESC ESC E" menu option. Entering zero (0) will force the instrument to always on.
6. The simulator does not shut off in the Standby Mode and will be on any time there is power to the instrument.

F. Temperature Monitoring

The Intoxilyzer 5000EN has a temperature monitoring feature that allows the instrument to verify the simulator temperature is $34^{\circ}\text{C} \pm 0.5$.

1. During the test sequence, prior to the performance verification check, the instrument will check the simulator temperature. If it is in range, on the final report will be printed "SIMULATOR TEMPERATURE IN RANGE". If it is out of range, the test sequence will be aborted.
2. This temperature monitoring feature is controlled through the "ESC ESC W" menu.
3. When this feature is turned off, before the performance verification check is performed, the operator will be prompted to answer the question "SIM IN RANGE Y/N".