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# C5A OXYGEN ANALYZER

## OPERATING INSTRUCTIONS

**UNIVERSAL ENTERPRISES, INC.**

Beaverton, OR 97005  
(503) 644-8723

## C5A

### COMBUSTION EFFICIENCY ANALYZER

#### I. Introduction

Universal's C5A is a portable digital solid state unit that is designed to enable technicians to quickly check and adjust oil, natural gas, propane, and coal fired residential and commercial appliances.

The handheld Universal C5A is powered by four AA batteries. It is used to give spot check readings. Since it measures only 6.7" x 3.9" x 2.1" it can easily be carried in a tool box or coat pocket. The self draining color coded water trap and low battery light provide indications of any abnormal conditions. A washable, reusable sponge filter is used as a particulate trap.

By comparing the percent O<sub>2</sub> reading against the net stack temperature, the efficiency reading can easily be determined from the Universal Efficiency Chart.

#### II. Specifications

Oxygen Measurement

Range: 0-25% Oxygen volume

Resolution: 0.1%

Accuracy: ±0.2%

Sample Time

Approx. 17-19 seconds

Display Time

30 Seconds

Dimensions

6.7"x3.9"x2.1"

Weight

1 lb. including oxygen cell and batteries

Electrical Requirements

Four AA alkaline batteries

#### III. Description

Power/Mode Selector Switch

This switch provides three modes of operation. When the switch is in the "CAL." position, the C5A will sample and display continuously. This position is used to calibrate the instrument to 20.9% oxygen, using the calibration knob. In the "ON" position, the C5A takes a 17 to 19 second time sample of the flue gas and displays the percentage of oxygen for 30 seconds after the sample button is pushed. The "OFF" position, is used for storage or when there are long periods of time between tests.

### O2 Calibration Knob

Before making tests, the C5A should be switched to the "CAL." position. The calibration knob should be adjusted until a 20.9% O<sub>2</sub> reading is achieved. The C5A may then be switched to the "on" position and the probe inserted into the stack.

### Start switch

When the mode switch is in the "ON" position, the start switch should be depressed to activate the sampling sequence. The reading is then displayed for 30 seconds.

### Display Window

Percentage of oxygen is displayed numerically by LED's. The "CAL." position provides continuous sensing and readout. The "ON" position provides a 30 second display after taking a 17 to 19 second sample.

### Probe

Stainless steel sampling probe conveniently folds away when not in use.

### Filter Cap

Simply unscrew the cap to change or clean filter as required. The cap should be hand tightened only.

### Low Battery Light

Low battery light signals the need to replace batteries.

### Water Trap Sight Window

This sight glass provides visual indication of excess moisture build up. Should the moisture reach the red stripes, discontinue use of the C5A and empty the trap. Also check the automatic drain to insure that it is not plugged.

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The sponge filter may be washed in ordinary soap and water. Be sure to thoroughly rinse and dry the filter before reinstalling it. After extended use the lead pellets may corrode and deteriorate. When this occurs, remove the bottom cap from the sight tube and replace them. During the periods of short term storage (up to one month) the oxygen sensor and batteries may be left in the unit. To prolong battery life, the C5A should be switched to the "off" position. The C5A should never be stored where it will be exposed to temperatures below 32°F for extended periods of time. For long term storage, the batteries and oxygen sensor should be removed. The oxygen sensor should be stored in its vial. Additional sensor life can be obtained by refrigerating (NOT FREEZING) the sensor in its vial. The C5A should be kept in a location where it will not be subject to temperature extremes.

## VI. AOS1 Installation Instructions

When installing the AOS1, care must be taken to avoid touching the orifice as dirt and skin oils may effect the sensor's performance.

1. Remove the sensor housing cover.
2. Install the sensor with the orifice facing down - away from the terminal screws.
3. Connect the red wire to the positive (+) terminal. Connect the black wire to the negative (-) terminal. Screws should be snug.

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### Automatic Water Trap Drain

During operation, the drain automatically discharges moisture. It is normal to feel a slight stream of air coming from the drain during operation. Make sure that the drain is not covered in any way during operation.

### Standoff (on back of C5A)

Stand off prevents damage to C5A by preventing contact with the hot stack during use.

## IV. Operating Instructions

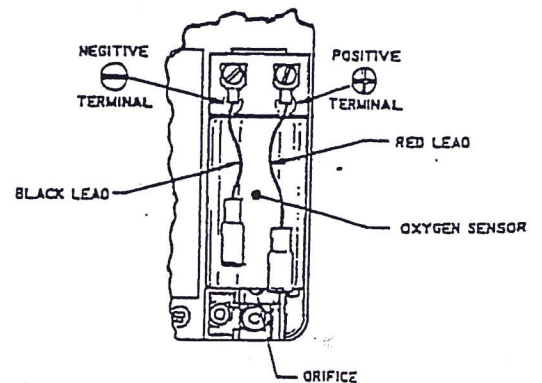
Switch the C5A to the "CAL." position. Allow 30 seconds for warm up. Calibrate the oxygen reading to 20.9% by adjusting the calibration knob. Switch the C5A to the "ON" position. Insert the probe into the stack and depress the sample button to take a reading. Be careful to insure that the case of the C5A does not touch the stack. Record the oxygen reading and obtain the net stack temperature (net temperature = stack temperature - room temperature). Using these two numbers, find the efficiency on the Universal Fuel Efficiency Chart.

## V. Maintenance and Storage

**IMPORTANT:** To prolong the life of the oxygen sensor, the sponge filter should have the moisture squeezed out of it whenever it is saturated. This will vary with the moisture content of the flue sample and should be checked after every 20 samples.

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4. When properly installed, the wires will run back over the body of the oxygen sensor to the terminal screws.
5. Replace the sensor housing cover. See (Fig.VI-1)



C5A  
(Fig VI-1)

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## VII. Repair Service

All service other than routine maintenance, should be performed by:

Service Center



8030 SW Nimbus • Beaverton, OR 97008  
(503) 644-8723 • Fax: (503) 643-6322

## VIII. Parts and Accessories

Accessories	Stock No.
Battery 1.5V alkaline, set of 4 (NEDA #15A).....	AB4
Carrying case.....	AC115
Oxygen sensor.....	AOS1
Pocket stack thermometer.....	T1000
Efficiency chart.....	FORM 6017



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( Service Center )

UEI  
8030 SW Nimbus Bldg #7  
Beaverton OR 97008

## LIMITED ONE YEAR WARRANTY

This product is warranted to the purchaser against defects in material and workmanship for one year from the date of purchase.

**What is covered:** Repair parts and labor, or replacement at the company's option. Transportation charges to the purchaser.

**What is not covered:** Transportation charges to the company. Damages from abuse or improper maintenance, see operating instructions. Any other expenses. Consequential damages, incidental damages, or incidental expenses, including damages to property. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

**How to Obtain Warranty Performance:** Attach to the product your name, address, description of problem, phone number and proof of date of purchase. Package and return to:

Service Center  
Universal Enterprises, Inc.  
8030 SW Nimbus  
Beaverton, OR 97008

**Implied Warranties:** Any implied warranties, including implied warranties of merchantability and fitness for a particular purpose, are limited in duration to one year from date of purchase. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

To the extent any provision of this warranty is prohibited by federal and state law and cannot be preempted, it shall not be applicable. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

## Applications

Universal's C5A Oxygen Analyzer puts you on the leading edge of oxygen analysis technology. The C5A is accurate, lightweight, and completely portable. Its exclusive self-draining moisture trap protects the oxygen cell, yet avoids the use of cumbersome and expensive in-line filters.

Simply insert the stainless steel probe into the flue and depress the start button. The sample is automatically taken and displayed on the unit's easy to read LED display.

The C5A requires no expensive or messy chemicals, has a reusable sponge filter and a self-draining water trap.

**DISTRIBUTED BY:**



**UNIVERSAL ENTERPRISES, INC.**



8030 SW Nimbus • Beaverton, OR 97008  
(503) 644-8723 • Fax: (503) 643-6322

## Oxygen Analyzer Two Year Limited Warranty

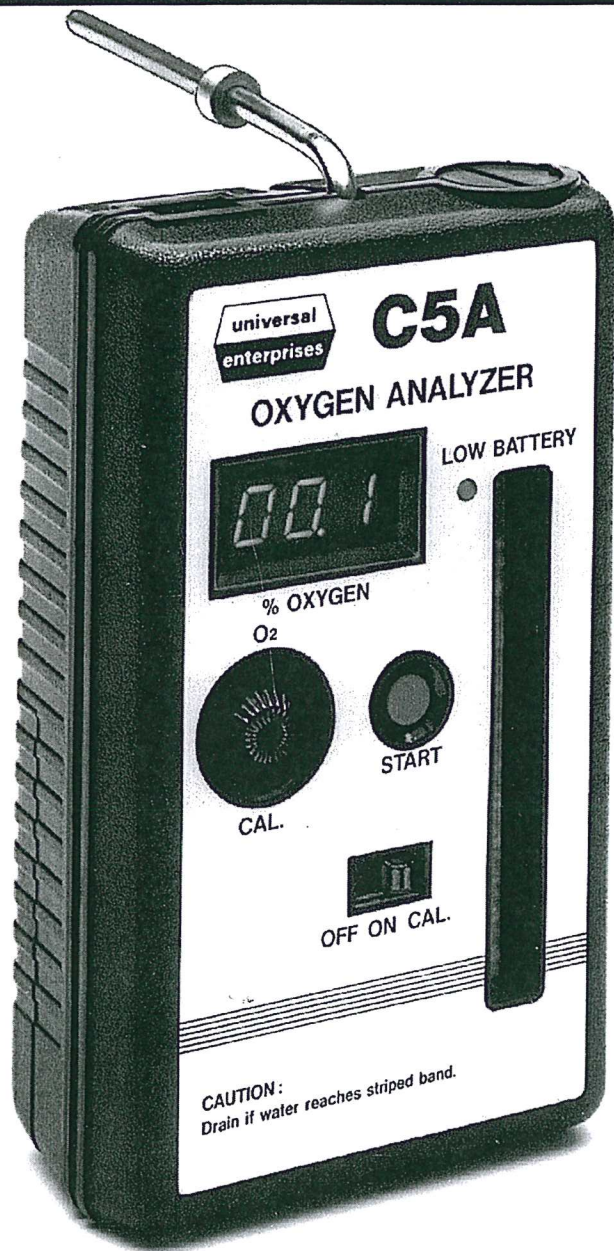


**Complete with carrying case, batteries, pocket stack thermometer, oxygen sensor, instructions and fuel efficiency charts.**

## C5A SPECIFICATIONS

### Test Features

<b>Range:</b>	0-25% oxygen volume
<b>Resolution:</b>	0.1%
<b>Accuracy:</b>	±0.2%
<b>Sample Time:</b>	17-19 seconds



# C5A

## Oxygen Analyzer

*This hand-held analyzer is specifically designed for Oxygen sampling.*

The C5A allows you easy oxygen analysis. The analyzer is accurate, lightweight, and completely portable. An exclusive self-draining moisture trap protects the oxygen cell and avoids the use of cumbersome and expensive in-line filters.

Simply insert the stainless steel probe into the flue and depress the start button. The sample is automatically taken and displayed on the easy-to-read LED display.

The C5A requires no expensive or messy chemicals, has a reusable sponge filter and a self-draining trap. The C5A comes complete with oxygen sensor, pocket stack thermometer, carrying case, instruction manual, fuel efficiency charts, and batteries.

### Specifications:

Range .....	0-25% oxygen volume
Resolution .....	0.1%
Accuracy .....	±0.2%
Sample Time .....	17-19 seconds

### C5A Standard Accessories:

Oxygen sensor .....	AOS1
Pocket stack thermometer .....	T1000
Fuel efficiency charts .....	25014
Carrying case .....	AC115
Battery, 1.5V (4) .....	AB4

### Optional Accessories:

Lead filter pellets .....	ALFP1
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8030 SW Nimbus # 7  
Beaverton, OR 97008

**UNIVERSAL ENTERPRISES, INC.**

~~5500 SW Arctic Drive, Beaverton, OR 97005~~

(503) 644-8723



# C100

## Combustion Analyzer

*The C100 allows servicemen to quickly check and adjust the efficiency of residential and commercial furnaces or boilers.*

### Specifications:

#### Oxygen

Range ..... 0-25.5%  
 Accuracy ..... ±0.3% of rdg  
 Resolution ..... 0.1%  
 Sample Time ..... Approx. 30 sec.

#### Temperature

Ambient Air ..... 32° to 212°F  
 Accuracy ..... ±2°F  
 Gas (flue temp) ..... 32° to 932°F  
 Accuracy ..... ±5°F

#### Efficiency

Range ..... 0 to 99.9%

### C100 Standard Accessories:

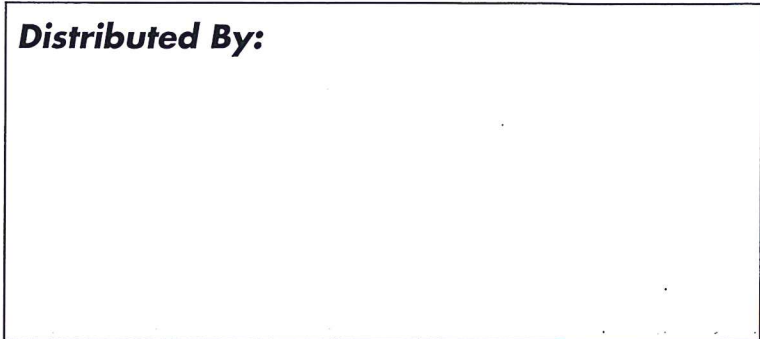
Oxygen sensor ..... AOS1  
 Stack temp. probe ..... ATT100  
 Carrying case ..... AC503  
 Battery, 1.5V (4) ..... AB4

### Optional Accessories:

Lead filter pellets ..... ALFP1  
 Battery eliminator ..... AACA1

- Completely portable and hand-held for easy operation.
- Measure oxygen (O<sub>2</sub>) and stack or ambient temperature.
- Calculate carbon dioxide (CO<sub>2</sub>) and efficiency from 4 fuel types.
- Stainless steel gas sampling probe folds away for easy storage.
- Air filter and self-draining water trap protect the O<sub>2</sub> sensor from damage.
- Consistent readings and longer battery life with new efficient pump design.
- Battery or AC (optional) powered.
- 3 Year Limited Warranty (6 month warranty on the oxygen sensor)

### Distributed By:



**UNIVERSAL ENTERPRISES, INC.**  
 5500 SW Arctic Drive, Beaverton, OR 97005

# Test and Service Kits

## Get organized with a Test and Service Kit from UEI.

UEI Test and Service Kits provide a convenient way to transport and protect your instruments and accessories. UEI offers A Kit and B Kit configurations.

The A Kit consists of the compact AC504 hard carrying case and one or two instruments with their associated accessories. (Size: 6½ x 13½ x 3½ inches)

The B Kit's larger AC506 hard carrying case has a pre-cut foam lining and includes spare batteries and fuses for the products included in the kit. (Size: 12½ x 17 x 3½ inches)



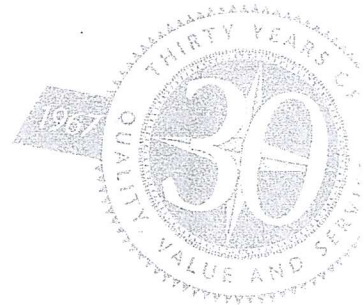
### 383/235BKIT

DM383 and DL235 in AC506 carrying case with spare fuses and batteries.



### 383/AC1AKIT

DM383, CA383, and TA1K in AC504 hard carrying case.



## Test and Service Kit Selection Guide

### A KITS (6½ x 13½ x 3½ INCHES)

383/40AKIT	DM383 and DL40
383/40/COAKIT	DM383, DL40, and ACO100
383/45AKIT	DM383 and DL45
383/45/COAKIT	DM383, DL45, and ACO100
383/AC1AKIT	DM383, CA383, and TA1K
383/AC2AKIT	DM383, CA383, and ACO100
383/AC3AKIT	DM383, TA1K, and ACO100
383/AC4AKIT	DM383 and CA383
383/COAKIT	DM383 and ACO100
420/40AKIT	DM420 and DL40
420/40/COAKIT	DM420, DL40, and ACO100
420/45AKIT	DM420 and DL45
420/45/COAKIT	DM420, DL45, and ACO100
420/AC1AKIT	DM420, CA383, and TA1K
420/AC2AKIT	DM420, CA383, and ACO100
420/AC4AKIT	DM420 and CA383

### B KITS (12½ x 17 x 3½ INCHES)

383/40BKIT	DM383 and DL40
383/40/COBKIT	DM383, DL40, and ACO100
383/45BKIT	DM383 and DL45
383/45/COBKIT	DM383, DL45, and ACO100
383/235BKIT	DM383 and DL235
383/AC1BKIT	DM383, CA383, and TA1K
383/AC2BKIT	DM383, CA383, and ACO100
383/AC4BKIT	DM383 and CA383
420/40BKIT	DM420 and DL40
420/40/COBKIT	DM420, DL40, and ACO100
420/45BKIT	DM420 and DL45
420/45/COBKIT	DM420, DL45, and ACO100
420/AC1BKIT	DM420, CA383, and TA1K
420/AC2BKIT	DM420, CA383, and ACO100

# Spot Check Oxygen and Efficiency Levels with Handheld Analyzers

ENVIRONMENTAL TESTERS



## C100



### Combustion efficiency analyzer

The C100 allows you to quickly spot check and adjust the efficiency of residential and commercial furnaces and appliances.

- Calculate carbon dioxide (CO<sub>2</sub>) and efficiency of four fuel types
- Measure oxygen (O<sub>2</sub>) and stack or ambient temperature
- Completely portable and handheld for easy operation
- Stainless steel gas sampling probe folds away for easy storage
- Self-draining, color coded water trap indicates abnormal conditions
- Air filter protects the O<sub>2</sub> sensor from damage
- More consistent readings with new, efficient pump design
- Battery or optional AC power
- 3 year limited warranty  
6 month warranty for oxygen sensor.

#### O<sub>2</sub> MEASUREMENT

Oxygen Range	0-25%
Accuracy	±0.3% of rdg
Resolution	0.1%
Sample Time	Approx. 30 sec.

#### TEMPERATURE

Ambient Air	32-140°F
Resolution	1°F
Gas (flue temp)	32-932°F
Accuracy	±7°F

#### EFFICIENCY

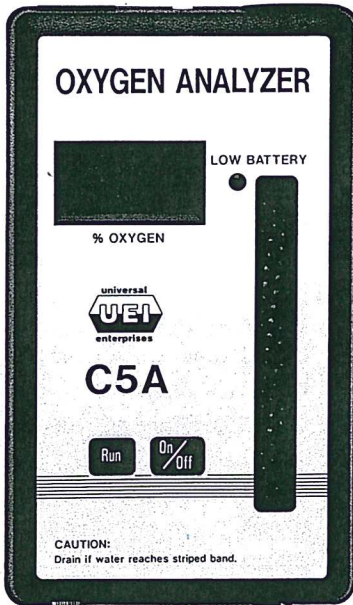
Range	0-99.9%
Resolution	0.1%

#### INCLUDED ACCESSORIES

Oxygen Sensor	AOS1
Stack Temp. Probe	ATT100
Carrying Case	AC503
Flexible Carrying Case	AC115
Battery AA (set of 4)	AB4

#### OPTIONAL ACCESSORIES

Lead Filter Pellets	ALFP1
AC Power Adapter	AACA1



## C5A



### Oxygen analyzer

#### O<sub>2</sub> MEASUREMENT

Oxygen Range	0-25%
Accuracy	±0.3% of rdg
Resolution	0.1%
Sample Time	Approx. 30 sec.

#### EFFICIENCY

Chart included

#### INCLUDED ACCESSORIES

Oxygen Sensor	AOS1
Pocket Stack Thermometer	T1000
Fuel Efficiency Charts	25014
Flexible Carrying Case	AC115
Battery AA (set of 4)	AB4

#### OPTIONAL ACCESSORIES

Lead Filter Pellets	ALFP1
AC Power Adapter	AACA1

### C100 / C5A

Use the C100 and C5A for oxygen trim or engine tuning applications. Call UEI for details on custom sampling tube configurations best suited for your application.