

### HHGA5C

### Hand Held 5 Gas Analyzer



#### Hand Held Gas Analyzer (HHGA5C)

The Snap-on<sup>®</sup> Hand Held Gas Analyzer HHGA5C is a self-contained, 5 Gas Analyser, that tests exhaust emissions for Carbon Monoxide (CO), Carbon Dioxide (CO2) Hydrocarbons (HC) Oxygen (O2), Oxides of Nitrogen (NOx) & Air Fuel Ratio/Lambda.

With a rotary dial and 4 buttons the HHGA5C is simple to use and set up thus providing the Technician with a truly portable 5 gas analyzer that is ideal for diagnostic work, pre compliance testing and servicing vehicles to manufacturers' specifications.

Can be operated using AC or DC power supply and an internal rechargeable battery

Durable 6 Line Illuminated Display – View all exhaust emission readings simultaneously

Bluetooth<sup>®</sup> Enabled - Allowing connection to appropriately configured devices.

**Improved Internal Battery Life** - In addition a "longer life" internal battery and a new "smart charge" system improves overall performance

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For Service and Calibration: Snap-on Tools U.S. Northern Repair Center 3011 East State Route 176 Crystal Lake, IL 60014

Dock 8

### For Technical Assistance Call:

### 1-888-633-6852

### Visit our Web site at: www.snapon.com

### **Safety Information**

#### Safety Notice

For your own safety and the safety of others, and to prevent damage to the equipment and vehicles upon which it is used, it is important that the accompanying *Safety Information* be read and understood by all persons operating, or coming into contact with, the equipment. We suggest you store this manual near the unit in sight of the operator

This product is intended for use by properly trained and skilled professional automotive technicians. The safety messages presented throughout this manual are reminders to the operator to exercise extreme care when using this test instrument.

There are many variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. Because of the vast number of test applications and variations in the products that can be tested with this instrument, we cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the automotive technician's responsibility to be knowledgeable of the system being tested. It is essential to use proper service methods and test procedures. It is important to perform tests in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area, the equipment being used, or the vehicle being tested.

It is assumed that the operator has a thorough understanding of vehicle systems before using this product. Understanding of these system principles and operating theories is necessary for competent, safe and accurate use of this instrument.

Before using the equipment, always refer to and follow the safety messages and applicable test procedures provided by the manufacturer of the vehicle or equipment being tested. Use the equipment only as described in this manual.

Read, understand and follow all safety messages and instructions in this manual, the accompanying safety manual, and on the test equipment.

#### Safety Message Conventions

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word indicating the hazard level.



moderate or minor injury to the operator or to bystanders.

Safety messages contain three different type styles.

- Normal type states the hazard.
- Bold type states how to avoid the hazard.
- Italic type states the possible consequences of not avoiding the hazard.

An icon, when present, gives a graphical description of the potential hazard.

#### Example:

#### **WARNING**

Risk of unexpected vehicle movement Block wheels before testing vehicle with the engine running *A moving vehicle can cause injury*.

### **Important Safety Instruction**

For a complete list of safety messages, refer to the accompanying safety manual.

## SAVE THESE INSTRUCTIONS

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### Introduction

#### Hand Held Gas Analyzer (HHGA5C)

The Snap-on<sup>®</sup> Hand Held Gas Analyzer HHGA5C is a self-contained, 5 Gas Analyser, that tests exhaust emissions for Carbon Monoxide (CO), Carbon Dioxide (CO2) Hydrocarbons (HC) Oxygen (O2), Oxides of Nitrogen (NOx) & Air Fuel Ratio/Lambda

The large display shows 6 readings at a time and all data can be printed via an optional infrared printer.

HHGA5C is Bluetooth<sup>™</sup> enabled allowing connection to appropriately configured devices.

With a rotary dial and 4 buttons the HHGA5C is simple to use and set up thus providing the Technician with a truly portable 5 gas analyzer that is ideal for diagnostic work, pre compliance testing and servicing vehicles to manufacturers specifications. Can be operated using AC or DC power supply and an internal rechargeable battery

#### FEATURES

- Durable illuminated 6 line display
- Bluetooth<sup>®</sup> Enabled
- AC/DC power supply
- Longer life internal rechargeable batteries
- "Smart" Fast Charging
- Ambient pressure sensor for automatic pressure compensation
- Infra red print function (printer sold separately)
- Standard or faster print option (Fast print with HHGA—PRINTER only)
- Unique Rotary Dial
- Built in water trap and filter
- Protective rubber boot with magnet
- Multilingual software including Spanish and French

### **HHGA5C** Operation

#### The HHGA5C is controlled using 4 Multi function buttons and a rotary dial



### **Gas Analyzer Base**



# BEFORE USING THE ANALYZER FOR THE FIRST TIME:

The HHGA5C can be powered from AC, DC or its rechargeable internal battery, which will power the analyzer for a limited time.

For extended use please connect the analyzer to AC or DC power supply.

#### Fully charge the battery before initial use.

#### Standard Charging

If connected to an AC or DC Power Supply and in use, or if connected to a Power Supply and switched off, the analyzer will charge a red indicator light with illuminate and "Battery Charging" will appear on the screen

The internal battery from full charge could last up to 120 minutes or longer depending on usage. To get the most from the internal battery

#### • For longer battery duration – Switch the pump OFF when not needed

Do not leave the analyzer unused and on charge for much longer than 1 week. Overcharging may reduce battery life

#### START UP

Switch the unit on using the **ON/OFF** Button (Press once) and the warm up countdown begins from 90-0

**IMPORTANT** – This must be done in fresh air without the analyzer connected to the exhaust

Once the warm up process is complete use the rotary dial to select the parameter required

- MENU
  - SET UP
  - o UNITS
  - o SCREEN
  - REPORTS
  - SERVICE
  - ANALYSER STATUS
- TIME TO NEXT AUTOMATIC ZERO
- GAS 1
  - DEFAULT ANALYZER SCREEN
- GAS 2
  - AUXILLARY SCREEN

#### INITIAL SET UP

Depending on your location it may be necessary to configure your analyzer. i.e. **Language** - English, Spanish, French etc. The HHGA5C automatically compensates for changes in barometric pressure so there is no need to make any internal adjustments for altitude etc.

If any changes are required:

Select the **MENU** option using the rotary dial and then scroll using the "**UP**" and "**DOWN**" keys to the required location and press "**ENTER**" to access.

Use UP, DOWN & ENTER to change the required parameter.

Connect the plastic spigot within the "spares pack" to the exhaust hose.

Connect the probe to the analyzer, insert the probe into the exhaust as far as possible, and allow a few moments for the display to start to register the readings.

#### **BLUETOOTH®**

HHGA5C is Bluetooth<sup>®</sup> enabled which allows it to be connected to appropriately configured devices. This connection requires the installation of additional software – see software installation instructions

#### **USER GUIDE**

The large display shows 6 readings at a time and is constantly measuring all gases. All the data can be printed via an optional infrared printer. The printed data can be "live, frozen or stored" data.

The analyzer can store up to 100 sets of readings within its memory

Although the analyzer has a small internal battery, we recommend that when the instrument is running and for extended vehicle testing, It is connected to the supplied AC/DC adapter or 9V DC supply. This will ensure there is no loss of power issues and will charge the battery.

If switched on but not in use then press the **PUMP** button to enter **STANDBY** mode. This will switch the **PUMP** off, prolonging the duration of the internal battery.

# **BEFORE EACH USE OF THE ANALYZER :**

Verify the water trap is empty and the particle filter is not dirty:

To empty water trap, unscrew and loosen the stopper and re seal once it is empty.

#### NOTE: ENSURE THAT THE STOPPER IS IN PLACE DURING USE

To check the filter remove protective rubber boot, pull out the water trap unit from the analyzer, remove the particle filter from the spigot and replace if required. Reconnect the water trap and rubber protective boot.

Check the exhaust probe and hose for damage. A leaky hose or probe will give erroneous readings; in particular the oxygen readings will be higher than expected.

After switch on, select STATUS to check fuel type, date and time are correct and battery power is sufficient.



Avoid exposing the instrument to sudden large temperature changes, and ensure that the unit reads zero for all gases (except O<sub>2</sub>) before use. If necessary re-zero (see: Menu Selection).

Avoid close proximity to radio transmitting devices, as readings may be affected.

# **USING THE ANALYZER - FOUR BUTTONS:**

The control buttons on HHGA5C have a dual function

#### 1- ON/ OFF & FREEZE DATA





#### 2- LOG DATA & SCROLL UP





#### 3- PUMP ON/OFF & SCROLL DOWN





#### 4- PRINT & ENTER



#### SWITCHING THE ANALYZER ON

Press **ON/OFF** button once to switch the unit **ON** and ensure its in fresh air. This lets the HHGA5C auto calibrate the sensors. Take care because in most workshop environments there can be high levels of HC up to 1 metre (3 feet) above floor level.

If **ZERO CAL** is shown on screen the pump will stop, press enter to start Zero process.

On "switch on", HHGA5C counts down from **90**. If HHGA5C will not auto calibrate one or more of the sensors need to be replaced or recalibrated by an authorized repair center.



The indicator light will highlight time remaining

When the countdown is finished the displays the last selected function.

#### SWITCHING THE ANALYZER OFF

Press and hold **ON/OFF** button to switch the analyzer **OFF**. The display counts down from 30 with the pump on to clean the sensors with fresh air.

If the probe is still connected, make sure analyzer and probe are in fresh air.

Press **PRINT / ENTER** if you want to stop the countdown and return to making measurements.

# **USING THE ANALYZER - ROTARY DIAL**

#### USING THE ROTARY DIAL (STARTING FROM MENU)

The rotary dial has 5 positions simply select the required section

1 – MENU



The indicator lights show the active line. Use the UP **DOWN ENTER** buttons to select the required line to change settings; for example SET UP



The indicator lights show the active line. Use the UP **DOWN VENTER buttons to select** the required parameter to change settings

To exit **SETUP** continue to scroll **DOW**N to the next screen, to **BACK** which will take you out of **SETUP** or alternatively rotate the dial to another section

Full **MENU** options as follows Use the **UP A DOWN V ENTER H** buttons to select the required parameter to make any changes

MAIN MENU	SUB MENU	OPTIONS / COMMENTS
SETUP	Language	English, French, German, Dutch, Italian, Spanish
	SET TIME	HH:MM:SS format e.g. 7 am = 07:00:00, 7pm = 19:00:00
	SET DATE	DD/MM/YY format
	PRINTER	STANDARD = HHGA-5 FAST = HHGA-PRINTER WIRELESS
	PASSKEY	1111 (wait 5 secs after entering last digit)
	BACK	
UNITS	FUEL TYPE	Petrol/Gas, LPG,CNG
	VEHICLE	Vehicle I.D (Shows on print out)
	LAMBDA/AFR	Select required option
	BACK	
SCREEN	CONTRAST	Factory setting is 14
	BACKLIGHT	Set in time 30 - 300 secs
	GAS 1	Default Gas Analyzer screen - users can customise the parameters on the display: LINE 1, LINE 2, LINE 3, LINE 4, LINE 5, LINE 6, BACK
	GAS 2	Auxiliary Gas Analyzer screen - users can customise the parameters on the display: LINE 1, LINE 2, LINE 3, LINE 4, LINE 5, LINE 6, BACK
	ВАСК	

**NOTE:** GAS 1 & GAS 2 Lines can only be changed if there are no stored readings – Please delete any stored readings to change the line information

MAIN MENU	SUB MENU	OPTIONS / COMMENTS
REPORTS	VIEW	Stored tests
	DELETE ALL	Stored tests
	LOG TIME	AUTO STORE - Set time interval between automatically logged tests. Default 10 seconds
	START LOG	Confirm start of automatically logged tests
	HEADER 1	Enter workshop details if required – These are printed on optional printer
	HEADER 2	Enter workshop details if required – These are printed on optional printer
	BACK	
SERVICE	CODE	Password protected for authorised service agents only Leave set to 000000.

#### 2 – HHGA5C STATUS

Current Fuel Selected	$\triangleright$	PETROL/GAS	$\triangleleft$
AFR or LAMBDA	$\triangleright$	AFR	$\triangleleft$
Current Time	$\triangleright$	09:00:00	$\triangleleft$
Current Date	$\triangleright$	08/08/16	$\triangleleft$
Blank	$\triangleright$	П	$\triangleleft$
Battery Charge level		BATTERY	

If any changes are required select **MENU** on the rotary dial

#### 3 - TIME TO ZERO

To maintain accuracy the HHAG5C will automatically zero every 30. The next zero time will be indicated here, to reset at any time press the enter KEY



After 30 minutes the HHGA5C will automatically request a zero this must always be done in fresh air



Press ENTER to start the process and follow the screen prompts



The HHGA5C will countdown from 30 seconds to complete the process



#### 4 - GAS 1

Following switch on with the pump running and when selected the default HHGA5C screen will show

Carbon Monoxide %	$\triangleright$	СО	0.00%	$\langle$
Hydrocarbons ppm	$\triangleright$	НС	0p	<
Carbon Dioxide %	$\triangleright$	CO2	0.0%	$\langle$
Oxygen %	$\triangleright$	02	21.0%	$\langle$
Oxides of Nitrogen ppm	$\triangleright$	NOx	0p	<
Air Fuel Ratio	$\triangleright$	AFR		<

In fresh air the reading should be zero apart from O<sub>2</sub>, to take a reading Insert the probe into the vehicle exhaust and allow the readings to stabilise.

If required each line can be customised by selecting MENU – SCREEN – GAS 1



Continue to scroll down to access LINE 6 and BACK

#### 5 - GAS 2

This is an auxiliary screen with two additional measurements.

Nitric Oxide %	$\triangleright$	NO	0р	$\triangleleft$
Corrected CO	$\triangleright$	COK	%	$\triangleleft$
Blank	$\triangleright$			$\triangleleft$
Blank	$\triangleright$			$\triangleleft$
Blank	$\triangleright$			$\triangleleft$
Blank	$\triangleright$			$\triangleleft$

If required each line can be customised by selecting MENU – SCREEN – GAS 2



The indicator lights show the active line. Use the **UP A DOWN V ENTER B** buttons to select the required line and to change settings.

Continue to scroll down to access LINE 6 and BACK

#### THE BACKLIGHT.

The backlight will automatically illuminate when a button is pushed or the dial is moved and will say on for a minimum of 30 seconds. This can be increased in the **MENU – SCREEN - BACKLIGHT** 

#### PRINTING DATA (OPTIONAL PRINTER

Press and quickly release the **PRINT / ENTER** button to start the analyzer printing. The analyzer displays "**PRINTING**" until this is completed.

Make sure the printer is switched on, ready to accept data and the infrared receiver at the bottom of the printer is in line with the emitter on top of the analyzer.

The HHGA5C will print the information from both GAS 1 and GAS 2 screens unless the line is blank.

#### **SWITCHING THE PUMP ON & OFF**

The analyzer normally operates with the pump on. Press the **PUMP** button to switch the pump off and on.

If the internal battery is low the pump will switch off.

When the pump is switched off, the analyzer displays "P/O"

Switching the pump off when not being used will increase the duration of the internal battery

#### DATA HOLD – "FREEZING THE DISPLAY"

Press **ON/OFF** quickly to freeze all readings (so analyzer beeps). The display flashes and the readings can be printed by pressing the **PRINT** key.

Press **ON/OFF** again for "live" measurements.

# **MEMORY FUNCTIONS**

The analyzer will log up to **100** tests these can be stored manually or automatically. To manually save readings (if memory locations are available) press and hold the **STORE** button The display will flash **LOGxxx** to give the storage location of the saved data

To access REPORTS select MENU use the UP/DOWN keys to select REPORTS and press ENTER



The indicator lights show the active line. Use the UP **DOWN VENTER buttons to select** the required line to change and to change settings .

Continue to scroll down to access **HEADER 2** and **BACK** 



When the line required is selected press ENTER and the indicator light will flash

Press ENTER again and use the UP/DOWN button to scroll through other logs or other gas readings.

All data can be printed using the optional printer. Rotate the dial to another section to exit stored logs **DELETE ALL** 

When selected confirm YES or NO to delete all stored information. This cannot be undone

#### LOG TIME – AUTOMATIC LOGGING OF TEST REULTS

Note: Zero may operate during auto store. If you need a sequence of up to 30 minutes of continuous readings it is recommended that you select ZERO via the menu before starting a series of Auto stored readings.

Use **UP/DOWN ENTER** to select **LOG TIME** to set the time required between each automatically stored test



Press ENTER to select – Default is 10 seconds Use UP/DOWN ENTER to change and confirm LOG TIME

#### START LOG



Press ENTER to select – Default is NO

Use UP/DOWN ENTER to change and confirm NO or YES to start logging process

NOTE: The HHGA5C will stop logging when the memory is full

#### HEADER 1 & HEADER 2

It is possible to add your Company details to any print outs produced using the optional printer. Select **HEADER 1** for Company name or **HEADER 2** for Phone number if required



Continue to scroll down to access **HEADER 2** and **BACK** 



Press ENTER to select

Use UP/DOWN ENTER to change and confirm details

Two lines of 20 characters can be added to the header of printouts

# **MEASURING EXHAUST GASES**

After the countdown is finished and the analyzer is correctly set up and with the pump running, connect the probe to HHGA5C and insert the probe into the vehicles exhaust, allow the readings to stabilise and read the results.

#### Readings in fresh air



Press **HOLD** first to "Freeze" the readings before printing. Press **PRINT** to print the results.

Every **30 minutes** the analyzer will automatically require to be re-zeroed. This needs to be done with the probe in fresh air.

Alternatively before starting a test sequence you can cause the sensors to re-zero using the **ZERO** function in **MENU**.

#### \*This is an example only

#### SAFETY ADVICE

#### 

The analyzer extracts combustion gases that may be toxic in relatively low concentrations. These gases are exhausted from the back of the instrument. This analyzer must only be used in well-ventilated locations by trained and competent persons after due consideration of all the potential hazards.

Make sure that the operating specifications aren't exceeded In particular:

Use the probe within its maximum temperature range (any plastic parts must not contact exhaust).

Exceeding the internal temperature operating range, placing the analyzer on a hot surface could affect operation

Ensure that water trap levels are not exceeded and that the particle filter does not become excessively dirty or blocked.

Ensure that the magnetic boot is free from metallic particles and any surfaces used when attaching the analyzer are appropriate.

When removing the exhaust probe after prolonged use, be aware that it may be hot and allow to cool before handling

#### **EXAMPLE PRINTOUT IN AMBIENT AIR (OPTIONAL PRINTER)**

The standard printouts are:

#### SNAP-ON SW19499 V0.09 SERIAL No.031416369

YOUR COMPANY NAME & PHONE NUMBER HERE

Date: 6 / 6 / 10 Time: 14:27:08

Vehicle AB11 DEF PETROL/GAS Fuel: 02 % 20.9 % CO2 0.0 HC ppm 0 0.00 CO % COK 0.00 ppm NOx 0 AFR . . . . . . . . NO ppm 0 COK %

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#### **BATTERY CHARGING INDICATION**

When the HHGA5C is switched off and connected to an AC or DC in-car supply the red indicator light on the front will illuminate. In addition the screen will display



The internal battery from full charge could last up to 120 minutes depending on usage To get the most from your internal battery

Switch the pump off when not being used as this will drain the battery quickly

The longer the analyzer runs on the internal battery the quicker it will discharge.

#### THE TOTAL INTERNAL BATTERY LIFE IS APPROX 120 MINUTES ON STANDBY (PUMP OFF)

#### **BATTERY PUMP SAVING FEATURES**

To assist in prolonging battery & pump life, the pump will switch off if the internal battery is low. The pump may be switched back on briefly a number of times to allow readings to be taken for about 1 minute.

In all cases when the internal battery level reaches a critical point where measurement accuracy may be compromised, the analyzer will go into sleep mode to conserve power so that normal operation can be resumed when external power is applied.

To protect the internal battery from deep discharge the analyzer will be switched off completely if the battery level falls too low.

NOTE: Allow a few seconds for readings to stabilize when re-connecting to external power

## WHEN YOU FINISH USING HHGA5C



Remove the probe from the exhaust - **THE PROBE WILL BE HOT** - let it cool and allow any water to drain out.

When the readings return to ambient levels, switch the analyzer off. The analyzer counts down from 30 before switch off with the pump running to self-clean its sensors.

Do not put the probe in water or coolant/antifreeze, which will be sucked into the analyzer, damaging the pump and sensors.

# ANALYZER PROBLEM SOLVING

If any problems are not solved with these solutions, contact the authorized repair center.

Fault symptom	Causes / Solutions
Oxygen too high CO2 too low	Air leaking into probe, tubing, water trap, connectors or internal to analyzer. Oxygen cell needs replacing.
Oxygen reading () Lambda/AFR () CO2 ()	The analyzer was stored in a cold environment and is not at normal working temperature. Oxygen cell is exhausted Pump is switched off
Batteries not holding charge The analyzer not running on AC adapter	Batteries exhausted. AC charger not giving correct output.
The analyzer does not respond to exhaust gas	Particle filter blocked. Probe or tubing blocked. Pump not working or damaged with contaminants. Water trap bung not in place.

### ANALYZER ANNUAL RECALIBRATION AND SERVICE

Although sensor life is typically more than 18 months the analyzer should be re-calibrated and serviced annually to stop any long-term sensor or electronics drift or accidental damage.

Local regulations may require more frequent re-calibration.

For Service and Calibration: Snap-on Tools U.S. Northern Repair Center 3011 East State Route 176 Crystal Lake IL 60014 Dock 8

# For Technical Assistance Call: 1-888-633-6852

Visit our Web site at: <u>www.snapon.com</u>

# **SPECIFICATION DATA**

Parameter	Resolution	Accura vol	icy*1 %	Specified Range	OVER RANGE		
Gas Measurement							
Oxygen	0.02%	+/-0.25%	+/-5%	0-21%	25%		
Carbon Monoxide	0.01%	+/-0.15%	+/-10%	5%	20%		
Carbon Dioxide	0.1%	+/-0.5%	+/-10%	0-15%	40%		
HC	1 ppm	+/-20ppm	+/-10%	2,000 ppm	10,000ppm		
NOx (5 gas version only)	1 ppm	+/-20ppm	+/-10%	1,500ppm*3	5,000ppm*3		
Pre-programmed Fuels		Petrol/Gasoline, LPG, CNG					
<b>Dimensions</b> Weight Handset Probe		1kg / 2.2lb 200mm / 7.9" x 45mm / 1.8" x 90mm / 3.5" 4m neoprene hose & 20 cm (insertion length) stainless steel flexible probe					
Ambient Operating Range		+0 Cto+40 C/32-104 F 10% to 90% RH non- condensing					
Battery Life		120 mins (or	standby) fr	om full charge			
AC adapter		Input: 100-240~ /50-60Hz/300Ma Output: 9vdc /1A					

\*1 Using dry gases at STP with the instrument not subjected to sudden changes of temperature, pressure, position or severe vibration - CO calibration applies to exhaust gas only with a CO concentration of 5% or more.

\*2 5,000ppm is absolute maximum, avoid prolonged reading above 1,500ppm NOx as sensor life may be reduced. NOx Zero may need to be reset by switching the unit on and off in fresh air.

Note: With the fuel set for CNG the HC reading is more sensitive to fluctuations than when the fuel is set for Gasoline/Petrol

## **ELECTROMAGNETIC COMPATIBILITY**

European Council Directive 89/336/EEC requires electronic equipment not to generate electromagnetic disturbances exceeding defined levels and have adequate immunity levels for normal operation. Specific standards applicable to this analyzer are stated below.

As there are electrical products in use pre-dating this Directive, they may emit excess electromagnetic radiation levels and, occasionally, it may be appropriate to check the analyzer before use by:

Use the normal start up sequence in the location where the analyzer will be used.

Switch on all localized electrical equipment capable of causing interference.

Check all readings are as expected. A level of disturbance is acceptable.

If not acceptable, adjust the position to minimize interference or switch off, if possible, the offending equipment during your test.

At the time of writing this manual (October 2020) we are not aware of any field based situation where such interference has occurred and this advice is only given to satisfy the requirements of the Directive.

This product has been tested for compliance with the following generic standards: EN 61000-6-3 EN 61000-6-1 and is certified to be compliant

Specification EC/EMC/KI/A5-4 details the specific test configuration, performance and conditions of use.



### Main Parameters:

Here are the legends used and what they mean:

O2 :	Oxygen reading in percentage (%)
CO:	Carbon Monoxide reading displayed in %
COK:	Carbon Monoxide calculation as if there were 0% Oxygen present. Generally known as Corrected CO. This value is calculated and used with the actual infra-red measured CO value. $COK = (COx15)/(CO+CO2)$ .
CO2 :	Carbon Dioxide calculation in %.
HC:	Hydrocarbon reading referenced to hexane
НСр:	Hydrocarbon reading referenced to propane
NO:	Oxides of nitrogen reading in ppm
DATE :	Date shown as day, month and year. The order can be changed using the menu function. Date is recorded when each combustion test is printed.
TIME :	The time is shown in hours and minutes, expressed in "Military" time or the 24hr clock. Time is recorded when each combustion test is printed.
LAMBDA:	Gives an indication of the burning efficiency of the engine.
AFR:	An alternative to Lambda. For petrol/gasoline fuel AFR = Lambda x 14.7. For LPG fuel AFR = lambda x 15.6 (typically).
TIME TO ZERO:	Every 30 minutes the analyzer will automatically demand to be re-zeroed. This needs to be done in fresh air.

### HHGA5C to VERUS<sup>®</sup>, VERIDICT<sup>®</sup> & PC\* Bluetooth<sup>®</sup> Connection using HHGA5V2 software

#### STEP 1

Install the software to VERUS®/VERDICT®/PC\*

1. Insert USB memory Stick that was supplied with your HHGA5C into the USB Slot on VERUS<sup>®</sup>/VERDICT<sup>®</sup>/PC\*



- 2. Open "My Computer" and double click "Removable Disk" the folder "HHGA5" should be visible.
- 3. Copy and Paste or Drag Folder "HHGA5set up" to the desktop of VERUS® or double click to open
- Double click HHGA5 set up and follow screen prompts an HHGA5 icon will appear on your desktop



5. Software successfully installed

#### STEP 2

#### Run Software

1. Double click software and follow screen instruction



#### 2. Click search, find HHGA5C in the "dropdown box" and then save



#### 3. Click Digital or Graph

C Max 0	CO	2		٦	NO	-		
pp			%				pp	
0	02			1	AFR		Ĩ	
%	35	18	%				1	
Trint Record ON	0000	0.00	00.0	20.85	0000	00.00	10:17:52	
12 Lines captured	0000	0.00	00.0	20.85	0000	00.00	10:17:55	

#### NOTE: Later versions of Windows®

If running software later than Windows XP<sup>®</sup> it may be necessary to change the compatibility setting of the HHGA5 application.

To do this "right click" the HHGA icon and select "Properties"

Click the Compatibility tab, ensure compatibility mode check box is ticked and from the drop down menu select Windows XP<sup>®</sup> (Service Pack 3). Click Apply and OK

Security	Details	Previous Versions
General	Shortcut	Compatibility
you have problem n earlier version of natches that earlier	is with this program ar Windows, select the version.	nd it worked correctly on compatibility mode that
lelp me choose i	the settings	
Compatibility mod	e	
Run this prog	gram in compatibility m	ode for:
Windows XP (S	Service Pack 3)	*
Settings		
🔲 Run in 256 c	colors	
🔲 Run in 640 x	480 screen resolution	1
🔲 Disable visua	al themes	
Disable desk	top composition	
🔲 Disable displ	ay scaling on high DP	'l settings
Privilege Level		
Run this proc	aram as an administrat	or
Change setti	ngs for all users	

\* Please note that we do not offer technical support for "third party" products.

This information assumes that you have some experience of installing devices and software on PCs. This is a general guide based on XP, your software may differ, particularly for later operating systems.

We recommend using the standard Microsoft<sup>®</sup> Bluetooth<sup>®</sup> drivers, for help with these in XP in particular see Microsoft<sup>®</sup>: <u>http://support.microsoft.com/kb/883258</u>

Other Bluetooth<sup>®</sup> drivers and dongles will usually work but we do not make any claim for these and details will differ. If third party drivers don't work it may be worth reverting to the Microsoft drivers since these work with most Bluetooth<sup>®</sup> serial port devices, or "dongles".

### **Software functions**

#### DIGITAL

Displays all gas readings plus AFR/Lambda in real time. Also shows Fuel type selected e.g. Gasoline Time to zero Internal Battery %

#### MAIN MENU

Returns to opening screen

**PRINT** – Allows printing of results plus addition of vehicle details and any preset readings required to compare results

#### RECORD

Readings can be stored as and reviewed on a .txt file on the VERUS<sup>®</sup>/VERDICT<sup>®</sup>/PC\* **Recording must be switched off before attempting to use STORE functions from the main menu** 

#### GRAPH

Displays all 5 Gases plus Lambda/AFR as a graph in real time Using the check boxes it is possible to select/deselect readings as required.

The scales on the graphs are:

CO	0-20%
CO <sub>2</sub>	0-20%
O <sub>2</sub>	0-20%
HC	0-2000 ppm
NO	0-2000 ppm
AFR	0-20
Lambda	0-2

#### MAIN MENU

Returns to the opening screen

**PRINT** – Allows printing of results plus addition of vehicle details and any preset readings required to compare results

#### STORE

**UPLOAD** – HHGA5C can store up to 100 individual test results internally. These can be transferred to a specified .TXT file for review

**VIEW** - Displays a stored (.TXT) (uploaded) test as a graph;

#### PRINTER SET UP

Standard Windows printer setup. A choice of Portrait or Landscape can be set.

#### **COMPANY HEADER**

The Company header that appears on printouts..

#### LIMITS

Specific gas values can be entered so they will appear on a print out as desired versus actual readings

#### **Troubleshooting connection**

Make sure VERUS<sup>®</sup>/VERDICT<sup>®</sup>/PC\* Bluetooth<sup>®</sup> is activated

Check VERUS®/VERDICT®/PC\* and HHGA5C are within range (approx 100ft)

Ensure HHGA5C and VERUS®/VERDICT®/PC\* are "Paired"

Ensure no interference from other sources

If HHGA5C is running on internal battery ensure it has sufficient charge

If a Passkey is requested enter 1111

### **Maintenance HHGA5C**

Check the water trap is empty and the particle filter is not dirty:

#### NOTE: IT'S THE INSIDE OF THE FILTER THAT GETS DIRTY

To empty water trap, unplug its rubber stopper and re-plug once it is empty.

#### NOTE: PLEASE ENSURE THAT THE WATER TRAP STOPPER IS IN PLACE DURING USE

If the filter requires changing remove protective rubber sleeve, pull out the water trap unit from the analyzer, remove the water traps particle filter from the spigot and replace. Reconnect the water trap and rubber protective sleeve.

Check the exhaust probe and hose for damage. A leaky hose or probe will give erroneous readings; in particular the oxygen readings will be higher than expected.

After switch on, check fuel type, date and time are correct and battery power is sufficient.

Avoid exposing the instrument to sudden large temperature changes, and ensure that the unit reads zero for all gases (except O2 before use. If necessary re-zero

Avoid very close proximity to radio transmitting devices, otherwise readings may be affected.

#### ANALYZER ANNUAL RECALIBRATION AND SERVICE

Although sensor life is typically more than 18 months the analyzer should be re-calibrated and serviced annually to stop any long-term sensor or electronics drift or accidental damage.

Local regulations may require more frequent re-calibration.

For Service and Calibration: Snap-on Tools U.S. Northern Repair Center 3011 East State Route 176 Crystal Lake IL 60014 Dock 8

# For Technical Assistance Call: 1-888-633-6852

Visit our Web site at: <u>www.snapon.com</u>