# DS400 / DS404

## *Docking Stations*

# Software Installation

# and Operations Manual



**DS400 Docking Station**

**DS404 Multi-inlet Docking Station**

## GfG Instrumentation

## Table of Contents

# Introduction

## For your Safety

This manual describes the intended use of the product and should be followed to avoid injury. Read and understand the instruction manual completely before operating, servicing, or maintaining this product.

This detector can serve its intended purpose only if it is operated, serviced, maintained and inspected according to the instructions given by GfG Instrumentation. The warranties given by GfG Instrumentation will be voided if the product is not operated, serviced, maintained and inspected in accordance with GfG's instructions.

The above does not alter statements regarding warranties and liabilities in the General Conditions of Sale and Delivery of GfG. Repairs may only be carried out by skilled or trained persons. Modifications and changes to the product may only be carried out with the approval of GfG. Unauthorized modifications to the product result in the exclusion of any liability for possible damage. Only genuine GfG accessories may be used together with the product. Only spare parts approved by GfG may be used for repair work.

**Note:** When using the docking station you have to remember that all gas detectors that are calibrated with the station will be affected. Incorrectly entered test gas concentrations will result in all gas detectors being incorrectly calibrated.

## Application and Purpose

The DS400/404 Docking Station is an automatic test station with one or four test gas ports for carrying out "bump tests" and for calibration of the zero point and sensitivity of the sensors of the G450 and G460 gas detectors.

## Installing and Connecting the Docking Station

During commissioning, the hoses and leads for fresh air supply, test gas supply, gas discharge, pressure switch, main power supply and PC interface or interface to a further docking station must be connected to the test station.

The docking station must be installed on a firm and even surface. The gases must be supplied pressure-free. During operation, the gas is drawn in by the pump of the docking station. Ensure also that the test gas can leave the docking station freely without pressure! If $CO_2$ sensors are also to be tested or calibrated using the docking station, a $CO_2$ absorption filter should be installed in the fresh air supply line (see section $CO_2$ absorption filter).

Ensure that the plug is installed on the T-piece of the gas supply line or that it is connected to a further docking station (DS400 only).

Up to two DS404 or three DS400 docking stations can be operated with one DS400-PS1 power supply unit. For this configuration the DS404 or DS400 have to be connected together using a double-sided jack plug.

During commissioning, the connections for gas supply, gas discharge, pressure switch, main power supply and PC interface or interface to a further docking station must be made as shown in the figure in the following section.

## Connections and Control Elements of the DS404



Gas discharge

Zero gas/fresh air supply

Pressure switch – channel 4
Test gas supply – channel 4

Pressure switch – channel 1

Ports for RS485



Connection for 12 V DC power supply unit

Connection for 12 V DC power supply unit

Green LED (on right in card slot)

SD card

Red LED (on left in card slot)

1  2  3  4
Display of active input
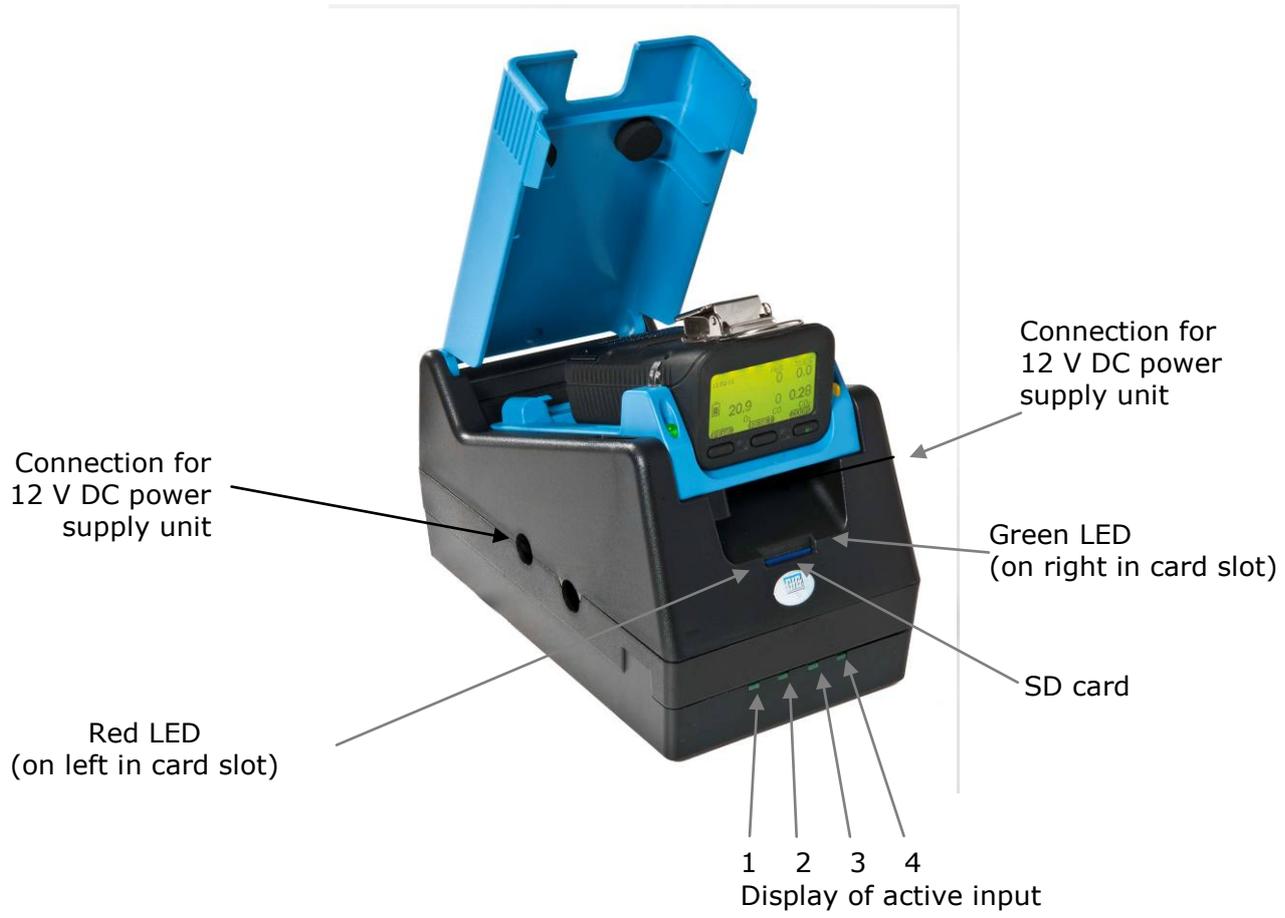
# Cradle Adapter

There are 2 adapters available. One version for detectors without an attached electric pump, and one for detectors with an attached electric pump (G400-MP2). The electric pump can remain connected to the detector for all functions. Both adapters can be used by the Docking Station as a charging cradle.

G400-DIC1D
for Microtector II
without pump

G400-DIC2D
for Microtector II
with pump
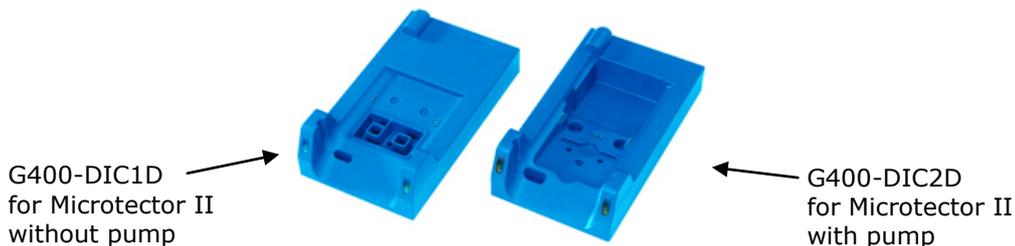
# CO$_2$ Absorption Filter

CO$_2$-free zero gas is required for testing and calibration of the CO$_2$ sensor zero point. As fresh air contains approximately 500 ppm CO$_2$, the disturbing CO$_2$ can be removed using a CO$_2$ absorption filter. The CO$_2$ is thereby absorbed by calcium hydroxide (80 %) / sodium hydroxide (5 %) / H$_2$O (15 %) in the following reaction:

$$CO_2 + 2\ NaOH \leftrightharpoons Na_2CO_3 + H_2O$$
$$Na_2CO_3 + Ca(OH)_2 \leftrightharpoons CaCO_3 + 2NaOH$$
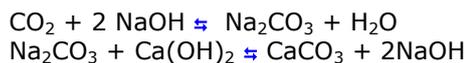
The absorber removes 1000 ppm CO$_2$ from approx. 2,500 l of air. This corresponds to a service life of approx. 5,000 minutes of zero gas pump operation with one docking station. The docking station calculates the service life on the basis of the flow rate and gives a warning to replace the filter when necessary. The filter gradually changes color to <u>pale</u> blue.

| CO$_2$ Absorber | CO$_2$ Absorbent | |
|---|---|---|
| Entfernt CO$_2$ und andere saure Gase. | Removes CO$_2$ and other acidic contaminants. | |
| Zylinder nicht öffnen. Verursacht Verätzungen. Darf nicht in die Hände von Kindern gelangen. Bei Berührung mit den Augen gründlich mit Wasser abspülen und Arzt konsultieren. R34, S2, S26, S37/39, S45 verwendbar bis / expiry: | Do not open cylinder. Causes burns. Keep out of reach of children. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. | Ätzend CORROSIVE |
| frisch / fresh | gesättigt / saturated | |

As water is also produced during the absorption process due to the chemical reaction, depending on the CO**₂** content of the air, this can have a minor influence on the setting of the sensor zero point.

# Operation

The docking station is operated by means of the control keys on the gas detector. The status and test data are output to the detectors display.

The DS400/404 Docking Station is switched on by connecting the plug-in power supply unit. The docking station can be set up for the connected gases and different functions using the configuration software. If a MICROTECTOR II Series detector is placed into the docking station, it is possible to select "**Info**rmation", "Function **Test**" or "**AutoCal** adjustment" via keys on the gas detector. In order to charge a gas detector, it must be switched off and placed in the docking station. If the detector is placed into the docking station while switched on, the necessary test or calibration will be started automatically after 10 seconds. Within the first 10 seconds you can override the automatic selection and start a function test or calibration manually.

# Charging

Turn the G450 or G460 off before placing it into the docking station. The charging procedure starts automatically.

**Yellow LED**

**Constantly lit:** Normal charging

**Flashing:** Trickle charge

**Green LED**

**ON:** Voltage supply for charging module switched on

**OFF:** Detector is in the docking station and function test or calibration is being performed

The charging process of an empty battery takes approximately 7 to 7 1/2 hours
After the normal charging process, the detector automatically switches to trickle charge.

# Function Test (Bump Test)

During the function (bump) test, the following points are checked:

- Check visual alarm
- Check audible alarm
- Check response time of sensor for alarm 1 and for alarm 2, depending on test gas concentration
- Depending on the configuration, check response time of sensor for $t_{50}$ or $t_{90}$
- Automatic data storage on SD card
- Setting of the clock
- Setting of the function test interval

Turn the G450 or G460 on and allow it to warm up until sensor readings are displayed before placing it into the docking station. If the TEST button is pressed within the first 10 seconds, the bump test is started. If no button is pressed, the bump test or calibration starts automatically after 10 seconds, depending on which interval has expired. The effective time for the bump test is approximately 20 seconds longer on the DS404 depending on the gas inlets used. During the test, the relevant test gas is supplied to the sensors and then they are adequately purged with fresh air.

The test progress and the function test report are shown on the display of the detector.

| Dockingstation | Bump test | Bump test - Report |
|---|---|---|
| Bump test Starts in **8 Sec.** | O₂ ⊠ CO₂ ⊠ CH₄ ⊠ H₂S − CO ⊠ | H₂S − CO Talm=8s/10s ✓ O₂ Talm=6s/7s ✓ CH₄ Talm=8s/17s ✓ CO₂ Talm=12s/18s ✓ |
| INFO  AutoCAL  TEST | | Please wait |
| Bump test automatically starts after 10 seconds | Bump test running | Purging with fresh air |
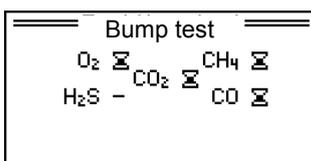
Talm = Response times for alarm 1 and alarm 2 of the respective test gas



T50 = t50 response time of the respective test gas



Test of audible and visual alarm o.k.



Response time alarm 1 / 2 for CO error – Response time too long



Response time t50 for CO error – Response time too long

**The following symbols signal the test result:**

$\Sigma$ = In process

**-** = Sensor not tested

√ = Sensor successfully tested

ⓢ = Sensor failed

**Result of the bump test:**

Check the proper performance of the test by inspecting the bump test report. The result of the bump test is also indicated by a red and a green LED in the SD card slot of the docking station using the traffic light principle. If the green LED is lit, the bump test was successful and the detector is ready for use again. However, if the red LED is lit or the display on the detector is red an error has occurred which has to be remedied before the detector can be used.



Bump test successful:

    Display is green + green LED lit in slot



Bump test failed:

    Display is red + red LED lit in slot

    Display of the error which has occurred

    (shown here Code 2: Flow error)

**Possible error messages:**

    **Code: 1  No gas defined** – DS400/404 is not configured

    **Code: 2  Flow error** – Fault in the zero or test gas supply

    **Code: 3  Aborted by detector** – Detector problem / fault

    **Code: 4  Power error** – Fault in supply voltage to DS400/404 power supply unit

    **Code: 5  Time too long** for test of the sensors

    **Code: 6  DS400/404 service necessary** – The DS400/404 has to be serviced

    **Code: 7  No SD card** – No SD card inserted

    **Code: 9  Parameter error** – An error has been detected in the parameter memory

    **Code: 12  Firmware below 3.44** – The firmware version on the detector is too old

    **Code: 13  Gas switch error** – The gas switch signals a fault

Additional information can be called up with the "Info" key. These messages do not lead to the bump test being aborted.

    1 = SD card
    2 = Gas pressure
    4 = $CO_2$ filter
    8 = Gas amount

If several errors occur at the same time, the error numbers are added:

    3  = 2 + 1              (Gas pressure + SD card)
    5  = 4 + 1              ($CO_2$ filter + SD card)
    6  = 4 + 2              ($CO_2$ filter + gas pressure)
    9  = 8 + 1              (Gas amount + SD card)
    10 = 8 + 2              (Gas amount + gas pressure)
    12 = 8 + 4              (Gas amount + $CO_2$ filter)

# Sensor Calibration (Calibration)

Turn on the G450 or G460 and allow it to warm up until sensor readings are displayed before placing it into the docking station. If the AutoCAL button is pressed within the first 10 seconds, the calibration is started. If no button is pressed the function test or calibration starts automatically after 10 seconds, depending on which interval has expired.

During sensor calibration, the calibration is first performed with fresh air. On sensors for toxic and flammable gases the zero point is set. The oxygen sensor is thereby set to 20.9 % vol. The IR sensor for carbon dioxide is calibrated to its zero point using a $CO_2$ absorber. Attention must be paid that uncontaminated air is supplied to the docking station.

The AutoCal-Gas function is used to set the sensitivity of the sensors. Always use a suitable test gas or test gas mixture for calibration with gas.

**CAUTION: Never attempt to use ignitable concentrations of gas with the DS400 / DS 404 docking stations!**

The sensors are purged after sensor calibration. Calibration typically takes approximately 3-4 minutes. When using the DS404 it could take longer depending on the gas inlets used and type of gas being used.

The progress of the calibration as well as the zero report (air) and cal report (gas) are shown on the display of the detector.



Calibration starts automatically
after 10 seconds



Purging



Purging



Result of sensor calibration with fresh air
($CO_2$-free) Reading before => after
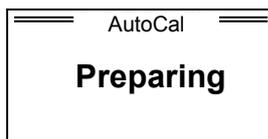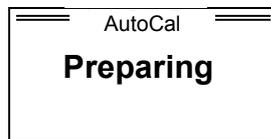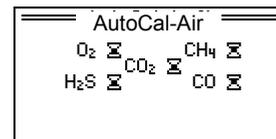


Sensor zero calibration
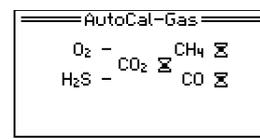


Sensor span calibration



Results of sensor calibration with test gas
(gas mixture) Reading before => after

**The following symbols signal the calibration result:**

⌛  = In process
-   = Sensor turned off (for autocal)
√   = Sensor successfully calibrated
⚡  = Error during calibration – not calibrated

**Result of calibration:**

Check the proper performance of the calibration by inspecting the zero and cal reports. The result of the calibration is also indicated by a red and a green LED in the SD card slot of the docking station using the traffic light principle. If the green LED is lit, the calibration was successful, and the detector is now ready for use again. If the red LED is lit or the display on the detector is red an error has occurred which has to be remedied before the detector can be used.



Calibration successful:

    Display is green + green LED lit in slot

Calibration failed:

    Display is red + red LED lit in slot
    Display of the error which has occurred
    (shown here Code 2: Flow error)

**Possible error messages:**

    **Code: 1  No gas defined** – DS400/404 is not configured
    **Code: 2  Flow error** – Fault in the zero or test gas supply
    **Code: 3  Aborted by detector** – Detector problem / fault
    **Code: 4  Power error** – Fault in supply voltage to DS400/404 power supply unit
    **Code: 5  Time too long** for calibration test of the sensors
    **Code: 6  DS400/404 service necessary** – The DS400/404 has to be serviced
    **Code: 7  No SD card** – No SD card inserted
    **Code: 8  CO2 filter exhausted** – $CO_2$ filter exhausted
    **Code: 9  Parameter error** – An error has been detected in the parameter memory
    **Code: 12  Firmware below 3.44** – The firmware version on the detector is too old
    **Code: 13  Gas switch error** – The gas switch signals a fault

Additional information can be called up with the "Info" key. These messages do not lead to the abort of the calibration.

    1 = SD card
    2 = Gas pressure
    4 = $CO_2$ filter
    8 = Gas amount

If several errors occur at the same time, the error numbers are added:

    3  = 2 + 1        (Gas pressure + SD card)
    5  = 4 + 1        ($CO_2$ filter + SD card)
    6  = 4 + 2        ($CO_2$ filter + gas pressure)
    9  = 8 + 1        (Gas amount + SD card)
    10 = 8 + 2        (Gas amount + gas pressure)
    12 = 8 + 4        (Gas amount + $CO_2$ filter)

# Data Storage/Data Transfer to a PC

All information of the bump tests and calibrations of the individual sensors are automatically stored on an SD card (if inserted). The data transfer to a PC is affected automatically when the docking station is connected to the PC. The data on the SD card can also be evaluated by means of a card reader without having the docking station connected to a PC. The data is transferred using the memory card reader program in the DS400/404 software.

Test data for storage both in the PC database and on the SD card:

**Detector information:**
- Type of detector
- Serial number
- Software version
- Sensor serial number (if applicable)
- Gas type
- Detection ranges
- Alarm thresholds: A1, A2, A3, STEL, TWA
- Battery capacity
- Confidence beep ON/OFF

**Docking station:**
- Date and time
- Mode: Bump test or sensor calibration
- Test gas and gas concentration
- Gas cylinder number (if specified)
- Test result
- Bump test:         Horn (audible alarm)
  LED (visual alarm)
  $t_{Alarm1}$
  $t_{Alarm2}$
  $t_{50}$ or $t_{90}$ (if specified)
- Sensor calibration:     Zero point (ZP) before sensor calibration
  Zero point (ZP) after sensor calibration
  Sensitivity (CAL) before sensor calibration
  Sensitivity (CAL) after sensor calibration
- DS400/404 Serial No. and name
- DS400/404 ID
- DS400/404 firmware version

# Software

## Installation

The software requires a Windows operating system. Install the program first with the SETUP program, which is started from the CD. When the CD is inserted, the setup program automatically starts. If this does not work, select the relevant CD drive in Windows Explorer, start the program manually by means of a double-click on the program icon and follow the instructions of the program. You may either use the suggested directory name and drive designation or select a different path. The program is then installed on the selected drive and directory. After installation, the program group "GfG\DS(TS)400/404" and the icons for starting the program are created.

## Installation of the USB Driver

Connect the RS485 USB interface cable to your PC. Windows recognizes the new hardware and asks for the driver. The driver is on the CD in directory USB_V206. Make Windows install the driver from this directory or search for the driver on the CD.

Two driver components are installed. The first driver is the USB driver, the second driver the virtual COM port. Depending on the PC configuration, a message will be displayed that the driver did not pass the Windows logo test under Windows XP or Windows 7. This message can be ignored. After successful installation you can see in the device manager (Start->System control->System->Device manager) which COM port was reserved for the USB adapter. The designation of the COM port, e.g.: COM4, is required for the setting in the software.

Installation instructions are on the following pages.

Note: some screen captures depicted in this manual have been modified for formatting purposes and may appear differently during the installation process.

| Installation Step 1. |
| :--- |
| DS400/404 software |

Start the installation software from the CD ROM and follow the install wizard. If your computer has Auto-Run enabled the installation will start automatically. Otherwise, run the program called Setup or Setup.exe from the CD ROM.

1. Preparing to Install
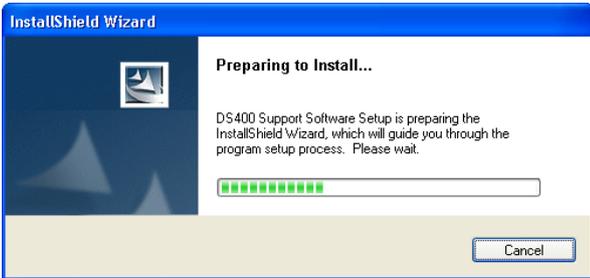


2. Select [ Next > ] when the Welcome screen is shown



3. Select [ Next > ] to start the wizard



4. Select "I accept the terms of the license agreement" and click [ Next > ].
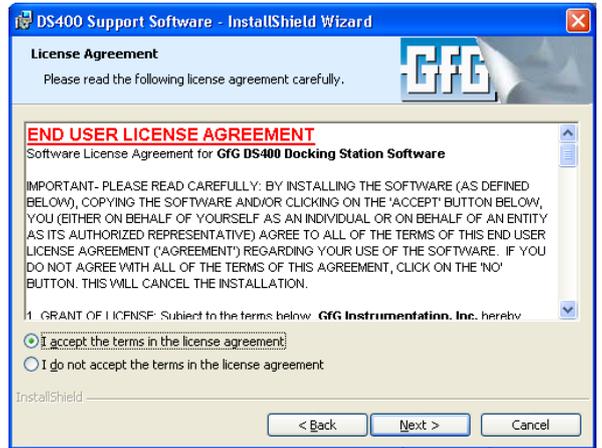


5. Enter the user information and click [ Next > ]:
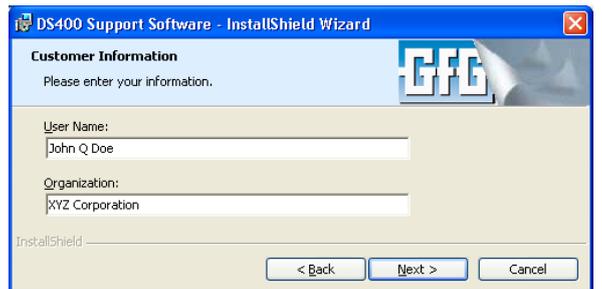


6. Confirm installation parameters and click [ Install ]



7. Installation progress



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8. Click [ Finish ] when the wizard has completed.



9. To start the DS400/404 program, select it from the folder you selected (GfG DS400/404). **Before running the program for the first time complete the USB Driver Installation below.**
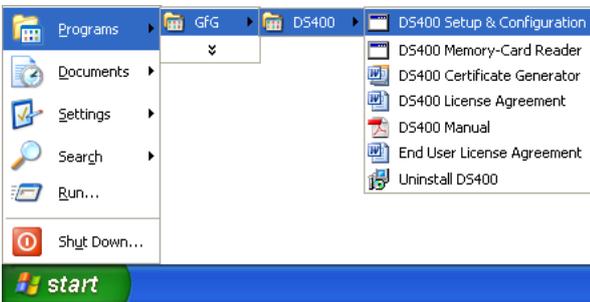


| Installation Step 2. |
| GfG USB Driver |

**IMPORTANT:** The steps below must be followed for correct installation of the USB drivers for the DS400/404 docking station.

*Note some screen captures depicted in this manual have been modified for formatting purposes and may appear differently during the installation process.*

1. Leave the CD-ROM labeled "DS400/404 docking station CD-ROM" in the CD-ROM drive.

2. Connect power to the DS400/404 Docking Station and connect it to the PC with the USB cable.

3. A "Found New hardware" message will appear



4. Follow the wizard when prompted. The first option is to allow or disallow Windows to search for software. Select "No, not this time".



5. Next, select "Install from list or specific location (advanced).
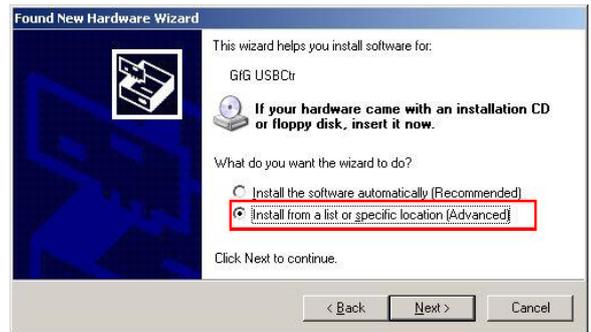


6. Select "Search for the best driver in these locations", and "Search removable media."
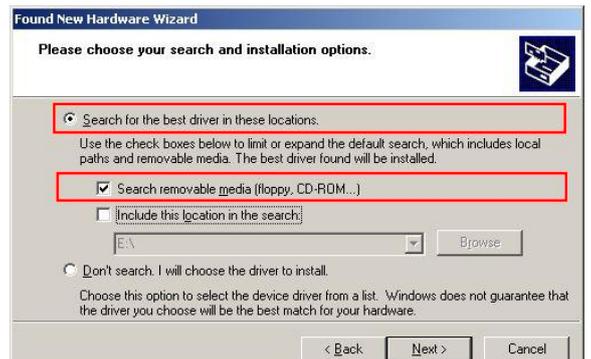


7. On the warning screen click [ Continue Anyway ]

12

8. The USB driver installation will begin.



9. When the installation is complete click [ Finish ].



10. Steps 3-9 will repeat to install the virtual com port then the message "New hardware is installed and ready to use" appears.



The USB driver is now properly installed.

**Installation Step 3.**
**Locating the COM port for The DS400 USB device**

After installing the GfG USB-Driver and the virtual COM port, the number that Windows assigned must be noted. It is needed to connect with the DS400/404.

1. Click on "Start".



2. If the Start menu includes "My Computer", right click on it and choose Properties, then go to step 3.
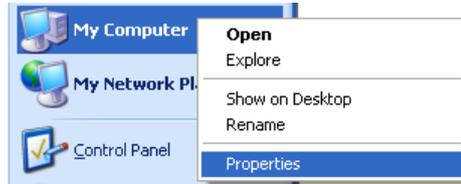


Otherwise select Settings, then Control Panel.
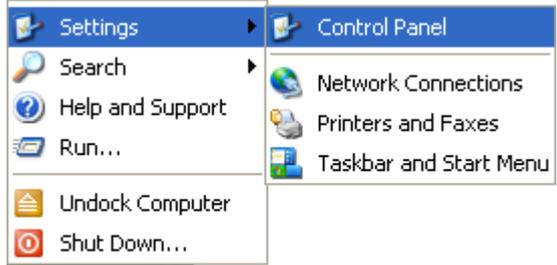


If the Control Panel is setup for Category View select Performance and Maintenance, then System



If the Control Panel is setup for Classic View select System
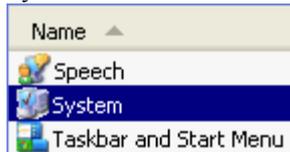


3. Whichever method used in step 2 the System Properties should now be displayed.
Click the Hardware tab
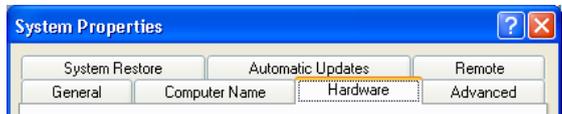


4. Click on the [ Device Manager ] button.

5. Locate the icon for "Ports" and click on the "+" symbol to expand that section.
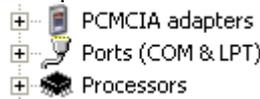


6. Locate the "GfG USB ctr" Port and note the COM number next to it (i.e. COM4).



7. This is the COM port number for the GfG DS400/404 Docking Station. When setting up the DS400/404 software this COM port will need to be assigned.

## Setting up the DS400/404 and running the software

Software requires a Windows operating system.
Connect the power supply and USB cable to the DS400/404.
To start the DS400/404 program, select it from the folder you selected (GfG DS400/404).
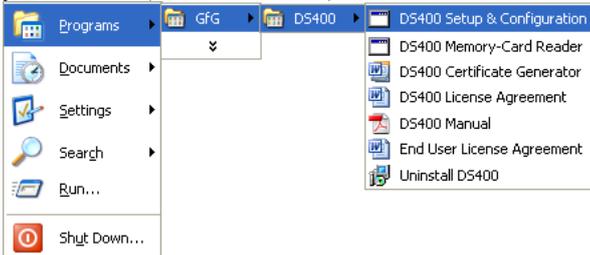
Please note: Each of the tabs described below must be saved individually, before proceeding to the next tab. Press "Set" to save each configuration.
The DS400/404 main screen will be shown
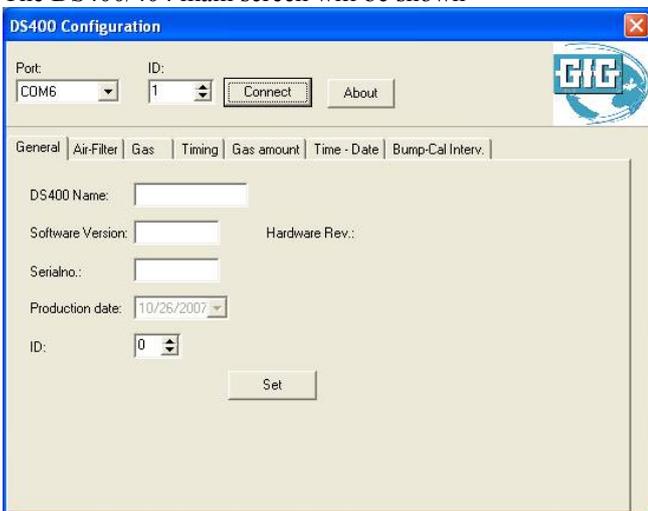
## DS400/404 Configuration – Connect and Disconnect

To open the communication port and to establish connection with the DS400/404 select the COM port noted in step 7 of the previous section and click the Connect button.
After all configurations are completed and saved in the following tabs, press the Disconnect button.

## DS400/404 Configuration - General
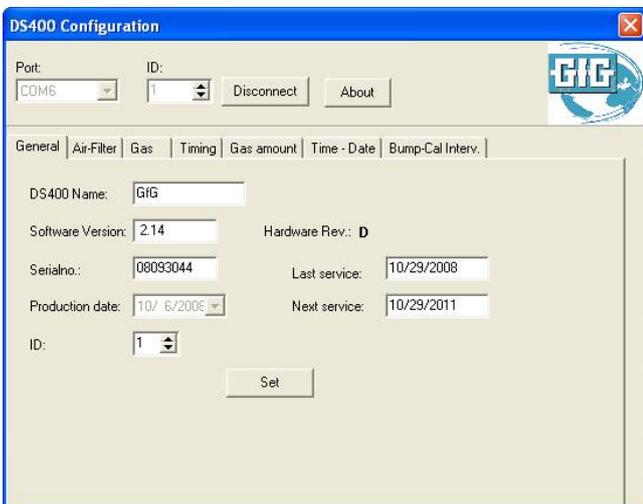
| Field | Description |
|---|---|
| DS 400/404 Name | Allows you to enter a unique identifier for the docking station. |
| Software Version | Displays the version of the docking station software. |
| Serial No. | Displays the serial number of the DS400/404. |
| Production Date | Displays the manufacture date of the DS400/404 |
| ID | Allows you to set a devise select ID. This is only required when multiple docks are connected to the same computer. |

## Air-Filter
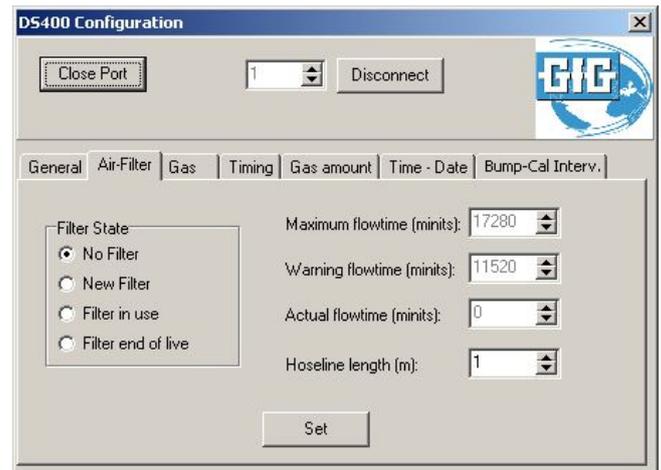
| Field | Description | |
|---|---|---|
| Filter State | Select the appropriate filter choice. | |
| | No Filter | $CO_2$ zero not adjusted |
| | New Filter | $CO_2$ zero auto adjusted |
| | Filter in Use | $CO_2$ zero auto adjusted |
| | Filter end of life | $CO_2$ zero not adjusted |
| Maximum flow time | Shows the approximate life left in the filter. | |
| Warning flow time | Shows when a warning will be received for replacing the filter. | |
| Actual flow Time | Determined by the docking station | |
| Hose line length | Enter the tube length in meters | |

## Gas
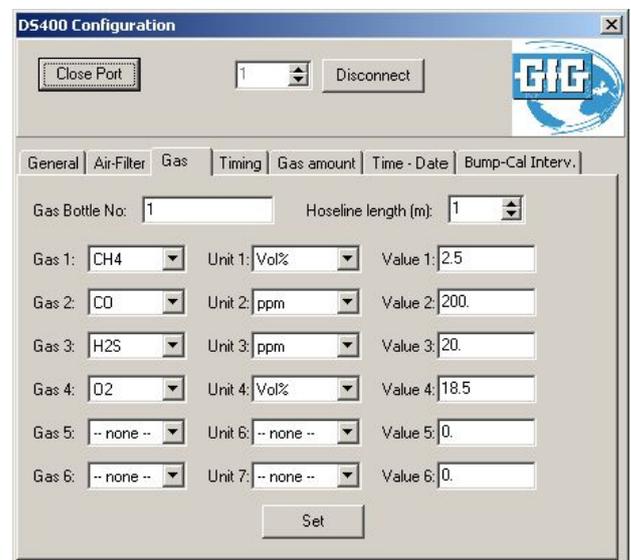
| Field | Description |
|---|---|
| Gas Bottle No | Allows you to enter the lot number for the cylinder of gas. |
| Hoseline length | Enter the tube length in meters |
| Gas (1-6) | Select the appropriate gas |
| Unit (1-6) | Set to Vol% or ppm depending on concentration of gas |
| Value (1-6) | Concentration of calibration gas |

## Timing

The timing for bump test and calibration parameters can be set on this screen.



| Field | Description |
|---|---|
| Bump Test Time | Set the maximum length in seconds for a bump test |
| Bump flush out | Set the length of time fresh air flows on the unit after gas exposure. |
| ZP – flush | Set the length of time the sensors are exposed to fresh air before auto zeroing. |
| CAL – flush | Set the length of time the sensors are exposed to gas before AutoCal® calibration. |
| Flush out | Set the length of time fresh air flows on the unit after calibration. |
| Bump Gas time | Allows selection of which response time will be tested. |

Note: These settings have been optimized and set at the factory for most common gases. Changing these settings may affect operation.

## Gas Amount

This feature is disabled on standard units



## Time-Date

Displays the PC time and the DS400/404 time.
Note: Time is automatically adjusted to the PC time if the difference in time is greater than 10 seconds.



## Bump-Cal Intervals



| Field | Description |
|---|---|
| Disable Cal/bump alarm | If checked will turn off the cal and bump reminder on start-up |
| Allow test without SD-Card | If checked will disable the requirement to have an SD card inserted when testing |
| Set Delta Days | If checked, it enables the cal/bump reminder on the gas detector. |
| Delta Bump Days | Set interval between bump test |
| Delta Cal Days | Set interval between calibrations |
| Set time at device | Transfers the data from this screen to the gas detector. |
| Turn device Off after test | If selected will turn off the gas detector after 5 minutes and begin the charge cycle. |

## Downloading Calibration/Bump Test Data from DS400/404

The DS400/404 software includes a program to download calibration history from the DS400/404 Docking Station to a computer.
Connect the power supply and USB cable to the DS400/404.

To start the DS400/404 program, select it from the folder you selected (GfG DS400/404).
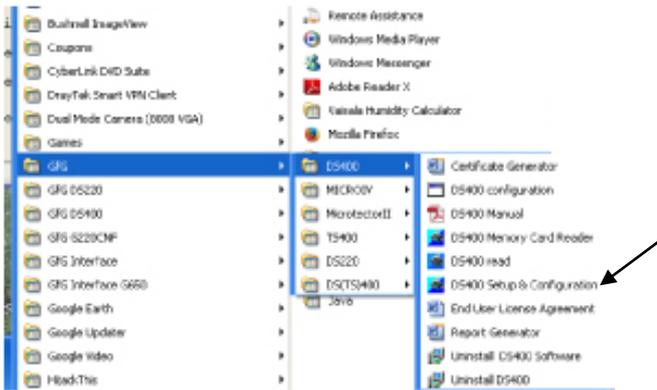


The Memory Card Reader program will start.
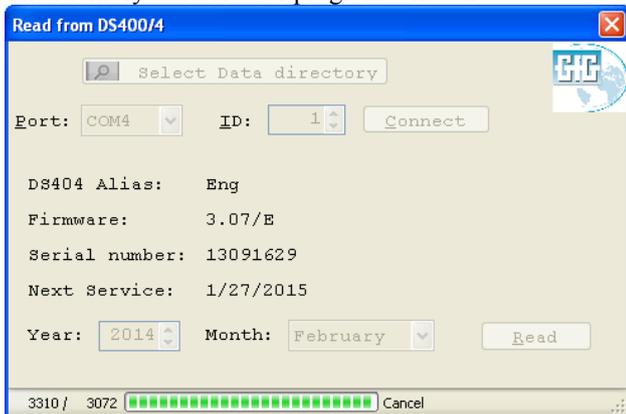


Select the directory then select the COM port for The DS400/404 USB device".
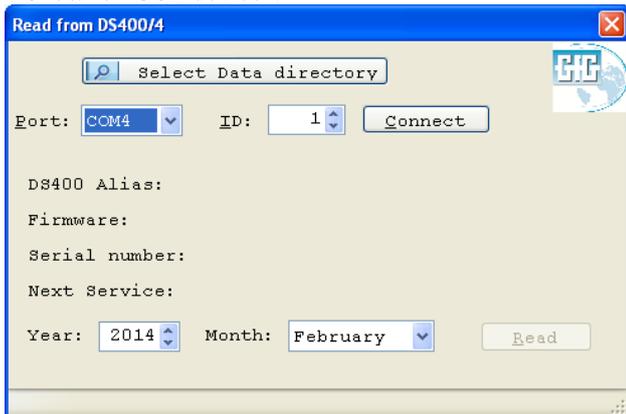


Click Connect.

Select the year and from the drop down list, select the month to be downloaded from the DS400/404 Docking Station and click Read.

The data from the DS400/404 will be read.

Note: If no data exist for the specific month and year a message will appear and the read/save operation will be canceled.

**Creating Bump Test and Calibration Certificates in Microsoft Word for Windows.**

The DS400/404 software includes a Microsoft Word Template, which will allow certificates to be generated quickly. The template is installed with the program files and can be started from the same location in the Start menu as the programs.
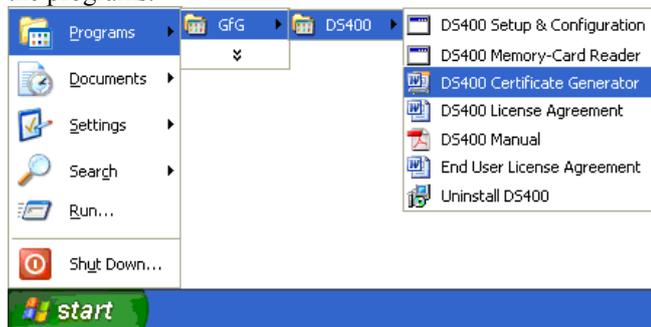
The template may be copied to any folder on the users computer and be started by loading it from that location (i.e. double clicking on the template).

The template includes macro code, which requires the macro security settings to be set to "Medium". Medium security will allow macros to run if the user accepts each time the template is loaded.

To change the security settings in MS-Word follow these steps:

1. Start MS-Word
   From the menu select Tools, Macro, Security.

2. The security dialog box will appear.
   If a menu item is not visible click ⌄ to expand the menu.
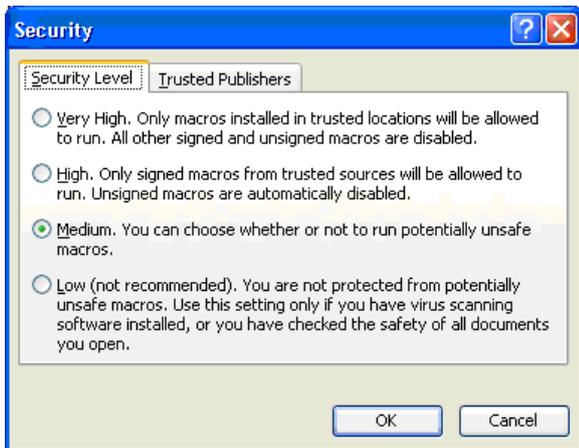
3. Select Medium on the Security Level tab

4. Press OK

Each time the certificate template is loaded the following dialog box will appear:
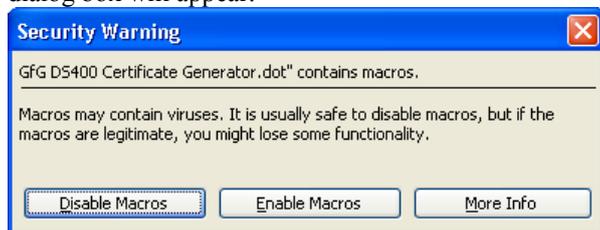
Click [Enable Macros] to allow the certificate functionality to run. If [Disable Macros] is pressed the certificate generator will not work and password protection will prevent manual editing. After the [Enable Macros] is pressed a blank copy of the main Certificate Form will appear:
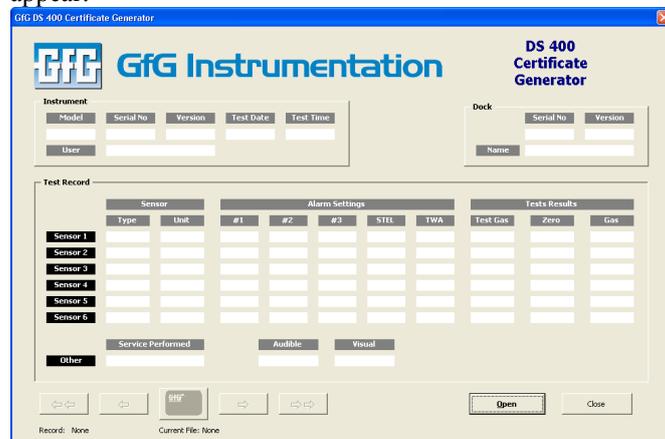
To generate a certificate a DS400/404 file must first be opened. A DS400/404 file is a data file from the DS400/404 SD memory card. Click the [Open] button and select the DS400/404 file from the location where it was stored on the computer. Once the file is opened the fields on the Certificate Form will be populated with the data from the first record in the database.
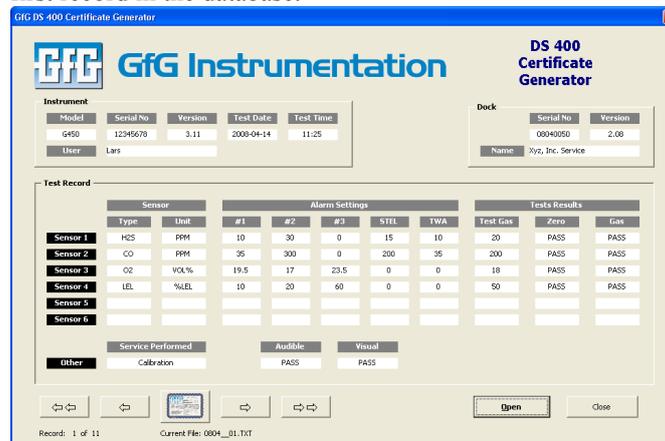
In the lower left it will be indicated how many records are in the database and which is shown: [Record: 1 of 11]. The navigation keys may be used to scroll through the records. [⇦⇦] selects the first record, [⇨⇨] selects the last record, [⇦] selects the previous record, and [⇨] selects the next record.

To create a certificate press the [⊞] button located between the navigation keys. Note the Certificate Generator will only allow a certificate to be generated if all tests have passed. Tests that have failed are noted with "Fail" in red print ( [FAIL] ). If an attempt to create an invalid certificate is made the following error will occur:

Once the certificate has been generated, [Close] the Certificate Form to view the final certificate.
The type of certificate generated depends on the specific tests performed on the DS400/404. If the instrument was calibrated a calibration certificate will be generated. If a functional bump test was performed then a bump test certificate will be generated.



**Calibration Certificate**

**G450**

Serial Number: 12103148

Version: 3.44

| Sensor | | Alarm Settings | | | | | Tests Results | | |
|--------|------|---------|---------|---------|------|------|------|------|-----|
| Sensor | Unit | Alarm 1 | Alarm 2 | Alarm 3 | STEL | TWA | Test | Zero | Gas |
| H2S | PPM | 10.0 | 15.0 | | 15.0 | 10.0 | 20.0 | PASS | PASS |
| CO | PPM | 35 | 50 | | 50 | 35 | 200 | PASS | PASS |
| O2 | VOL% | 19.5 | 17.0 | 23.5 | | | 20.9 | N/A | PASS |
| CH4 | %LEL | 10.0 | 20.0 | 60.0 | | | 50.0 | PASS | PASS |

Audible Alarm: PASS
Visual Iarm: PASS

Calibration performed by
GfG DS400 Docking Station
Henderson
S N:12120202
Version: 3.04

Technician
Tested          Date:          2013-05-01
                Time:          06:10

Date

The certificate generated may be printed and/or saved as a word document. The document is protected and cannot be edited.

To create another certificate you may load the template

GfG DS400
Start Certificate Generator

again, or to overwrite the existing certificate select "Start Certificate Generator from the GfG DS400/404 menu.
Before the next certificate can be generated a warning will appear if the certificate generated previously has not been saved.

**DS400 Certificate**

? The current certificate has not been saved.

Continuing will overwrite the current certificate with a new certificare
Are you sure you want to continue?

[Yes]    [No]

If the certificates generated need to be saved individually, use the Save As… function or load a new copy of the certificate generator each time.

## Creating Bump Test and Calibration Certificates or Reports Using The HTML Version Programs

The DS400/404 software CD also includes HTML programs which will allow certificates and reports to be generated quickly and easily, without using Microsoft Word. These programs are not installed automatically with the DS400/404 program files and may either be started from the included CD, or the programs may be copied to any folder on the user's computer.

These programs use your internet browser to open, view, or to print calibration and bump test records. No internet connection is necessary, but an internet browser is required (e.g. Google Chrome).

There are four different programs included on the CD, Certificate Generator, Certify All, Report Generator Summary, and Report Generator Complete. The descriptions and operating instructions for each program are detailed in the following paragraphs.

### Certificate Generator

Select and open the program from the CD or the folder where it was saved.



certificate_generator_v00.78.html

The program will open your browser and display the Certificate Generator template.



To generate a certificate, a DS400/404 file must first be opened. A DS400/404 file is a data file from the DS400/404 SD memory card. Click the Browse button and select the DS400/404 file from the location where it was stored on the computer. Once the file is opened the fields on the Certificate Form will be populated with the data from the first record in the data file.
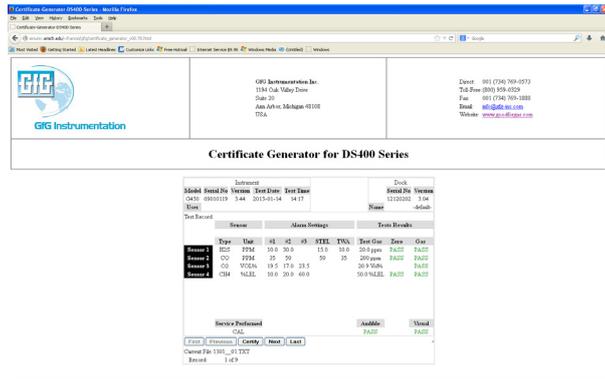


In the lower left corner it will indicate how many records are in the data file and display in this manner: Record: 1 of 11. The navigation keys may be used to scroll through the records.

You may scroll through the records using the navigation keys, First , Last , Previous and Next . To create a certificate press the Certify button located between the navigation keys. Note: the Certificate Generator will only allow a certificate to be generated if all tests have passed. Tests that have failed are noted with "Fail" in red print ( FAIL ).

Once the certificate has been generated, you may print the certificate by clicking Print or save the certificate (depending on the browser used). The document is protected and cannot be edited. After printing the certificate, click Close to return to the template to access another record from the file.

The type of certificate generated depends on the specific tests performed on the DS400/404. If the instrument was calibrated, a Calibration Certificate will be generated. If a functional bump test was performed, then a Bump Test Certificate will be generated.
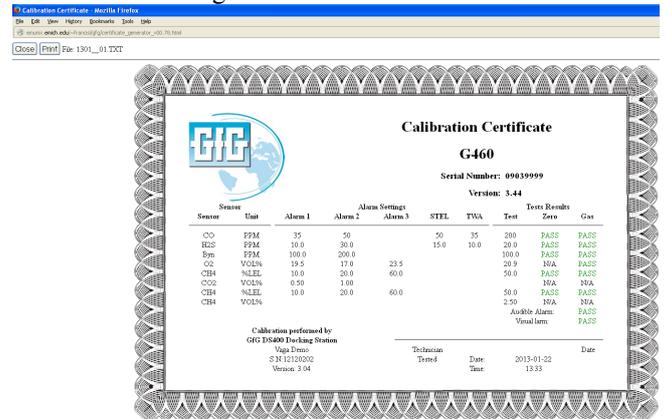


### Certify All

Select and open the program from the CD or the folder where it was saved.



certificate_generator_all_v00.80.html

The program will open your browser and display the Certificate Generator template.



To generate all passing certificates, a DS400/404 file must first be opened. A DS400/404 file is a data file from the DS400/404 SD memory card. Click the Browse button and select the DS400/404 file from the location where it was stored on the computer. Once the file is opened the form will show the number of records contained in the file, and the number of certificates that can be generated (e.g. certifiable records: 29 of 73). Note: the Certificate Generator will only allow a certificate to be generated if all tests have passed.

To create certificates for all passing tests in one step, press the [ Certify All ] button. Once the certificates have been generated, you may print all of the certificates by clicking [ Print ] or save the certificates (depending on the browser used). These documents are protected and cannot be edited. After printing the certificate(s), click [ Close ] to return to the template. To access another data file, this program must be closed and restarted.

The type of certificate generated depends on the specific tests performed on the DS400/404. If the instrument was calibrated, a Calibration Certificate will be generated. If a functional bump test was performed, then a Bump Test Certificate will be generated.
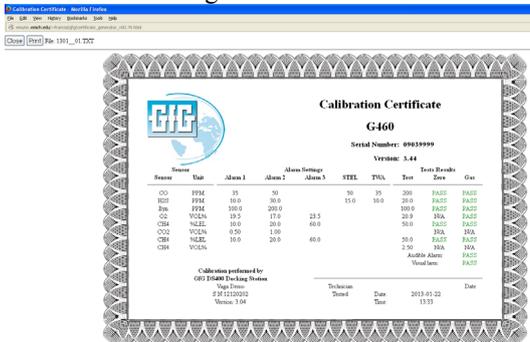


**Report Generator Summary**
Select and open the program from the CD or the folder where it was saved.



report_generator_summary_v01.05.html

The program will open your browser and display the Report Generator Summary template.



To generate a report, a DS400/404 file must first be opened. A DS400/404 file is a data file from the DS400/404 SD memory card. Click the [ Browse ] button and select the DS400/404 file from the location where it was stored on the computer. Once the file is opened a table will be displayed showing the summarized data for all records contained in the data file.
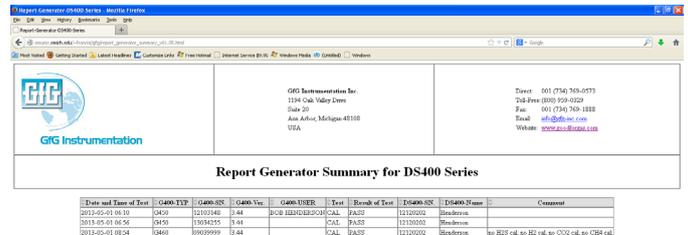
You may print the report, or save (depending on the browser used) the report. The document is protected and cannot be edited. To access another record from the file, this program must be closed and restarted.

**Report Generator Complete**
Select and open the program from the CD or the folder where it was saved.



report_generator_complete_v00.61.html

The program will open your browser and display the Report Generator Complete template.



To generate a report a DS400/404 file must first be opened. A DS400/404 file is a data file from the DS400/404 SD memory card. Click the [ Browse ] button and select the DS400/404 file from the location where it was stored on the computer. Once the file is opened a table will be displayed showing the individual sensor data for each test.
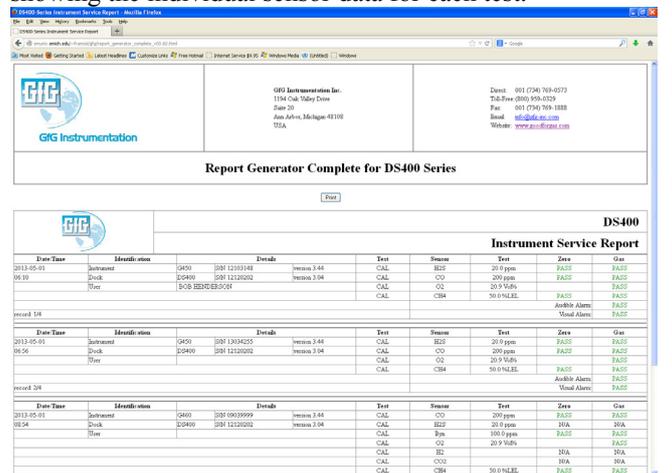


You may print the report, or save (depending on the browser used) the report. The document is protected and cannot be edited. To access another record from the file, this program must be closed and restarted.

# Appendix

## Care

Soiling of the detector housing can be removed using a cloth dampened with water. Do not use solvents or cleaning agents!

## Maintenance and Inspection

Regular inspection of the $CO_2$ absorption filter (if equipped) and hose connection is recommended.

## Troubleshooting

| Code | Fault / message | Cause | Remedy |
|------|-----------------|-------|--------|
| | Red and green LED in SD card slot lit continuously | Error in program memory or error in main memory | Switch detector off and on again<br>Contact GfG Service, if necessary |
| 1 | "No gas defined" | DS400/404 is not configured or error in parameter memory | Configure DS400/404<br>Contact GfG Service, if necessary |
| 2 | "Flow error!" | Fault in the gas supply | Remedy interruption in the test gas supply<br>Contact GfG Service, if necessary |
| 3 | "Aborted by detector!" | Fault in gas detector | Switch DS400/404 and detector off and on again<br>Repeat procedure |
| 4 | "Power error!" | Fault in operating voltage of the DS400/404 | Replace plug-in power supply unit<br>Contact GfG Service, if necessary |
| 5 | "Time too long!" | Function test of the sensors taking too long | Check gas supply |
| 6 | "DS400/404 service necessary!" | Service date has been exceeded by max. 21 days | Contact GfG Service |
| 7 | "No SD card!" | SD card not inserted or cannot be written | Insert or replace SD card |
| 8 | "CO2 filter exhausted!" | The $CO_2$ absorption filter is exhausted | Replace CO2 absorption filter and reset in the configuration program |
| 9 | "DS400/404 parameter error!" | Error in parameter main memory | Switch detector off and on again<br>Reconfigure, if necessary<br>Contact GfG Service, if necessary |
| 12 | "Firmware below 3.44" | Detector software version too old | Carry out detector update<br>Contact GfG Service, if necessary |
| 13 | "Gas switch error" | The gas switch is faulty | Contact GfG Service |
| I 1 | "DS400/404 service due" | Service date exceeded or clock incorrect or not set | Contact GfG Service |
| I 2 | INFO "Gas pressure!" | Gas pressure too low if external gas pressure switch is installed | Check test gas cylinder and replace, if necessary |
| I 8 | INFO "Gas amount!" | Test gas cylinder almost empty | Replace test gas cylinder and reset with the configuration program |

# Technical Data

| | |
|---|---|
| **Type designation:** | **DS404** |
| **Display and control elements:** | Display and 3 buttons on G450 or G460 |
| **Power supply:** | 12 V DC / 1.25 A (2 input/output jacks) |
| **Gas** | |
| Connections: | 1 zero gas inlet, 4 test gas inlets, 1 gas outlet  (for hose $d_i \approx 1/2$ cm or 5 mm) |
| Delivery rate: | Flow rate: 0.5 to 0.6 l/min; drawn in by internal pump (pressure-free) |
| Pressure monitoring: | 4 electric inputs for floating contacts  (2 input/output jacks) |
| **Time** | |
| Bump test: | 20 - 60 sec. (depending on setting and test gas concentration) |
| Calibration: | 2 - 10 minutes (depending on sensor type and number of test gases) |
| **Data** | |
| Storage medium: | 2 GB  SD card   (formatted with FAT or FAT16 file system) |
| Communication: | RS-485   (2x RJ45 modular jacks) |
| **Housing** | |
| Protection class: | IP-20 |
| Material: | Plastic |
| Dimensions: | 4.92x6.65x8.86 inches / 125x169x225 mm  (WxHxD) |
| Weight: | 52.91 ounces / 1500 g  including G400-DIC1D |

# Accessories and Replacement Parts

| | Part Number |
|---|---|
| Configuration CD | 3005-404 |
| CO2 absorption filter | 804765 |
| Demand flow regulator – inside thread | 1419-216 |
| Demand flow regulator – outside thread | 1419-217 |
| USB cable | 14500231 |
| Charger | 4001-650D |
| Vehicle charger | 4001-650DV |
| Single tray | 1450195 |
| Double tray | 1450196 |

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| | |
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**GfG Instrumentation**

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