

# TS400

***Test Station for G450/G460 Gas Detector***

# Operations Manual



**GfG Instrumentation**

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# **GfG Products for Increased Safety**

Congratulations on your purchase of a high technology product from GfG – you have made an excellent choice!

Our detectors are characterized by reliability, safety, peak performance and economic efficiency. They comply with national and international directives.

This manual will help you operate the device quickly and safely.

Please take note of these instructions before putting the device into operation!

If you have any questions, please feel free to contact us.

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# Introduction

## For your Safety

Like any piece of complex equipment, the GfG TS400 will do the job it is designed to do only if it is used and serviced in accordance with the manufacturer's instructions.

**CAUTION:** For safety reasons, this equipment must be operated and serviced by qualified personnel only. Read and understand the instruction manual completely before operating or servicing this device.

The warranties made by GfG with respect to the product are voided if the product is not used and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following them. The above does not alter statements regarding GfG's warranties and conditions of sale and delivery.

## Application and Purpose

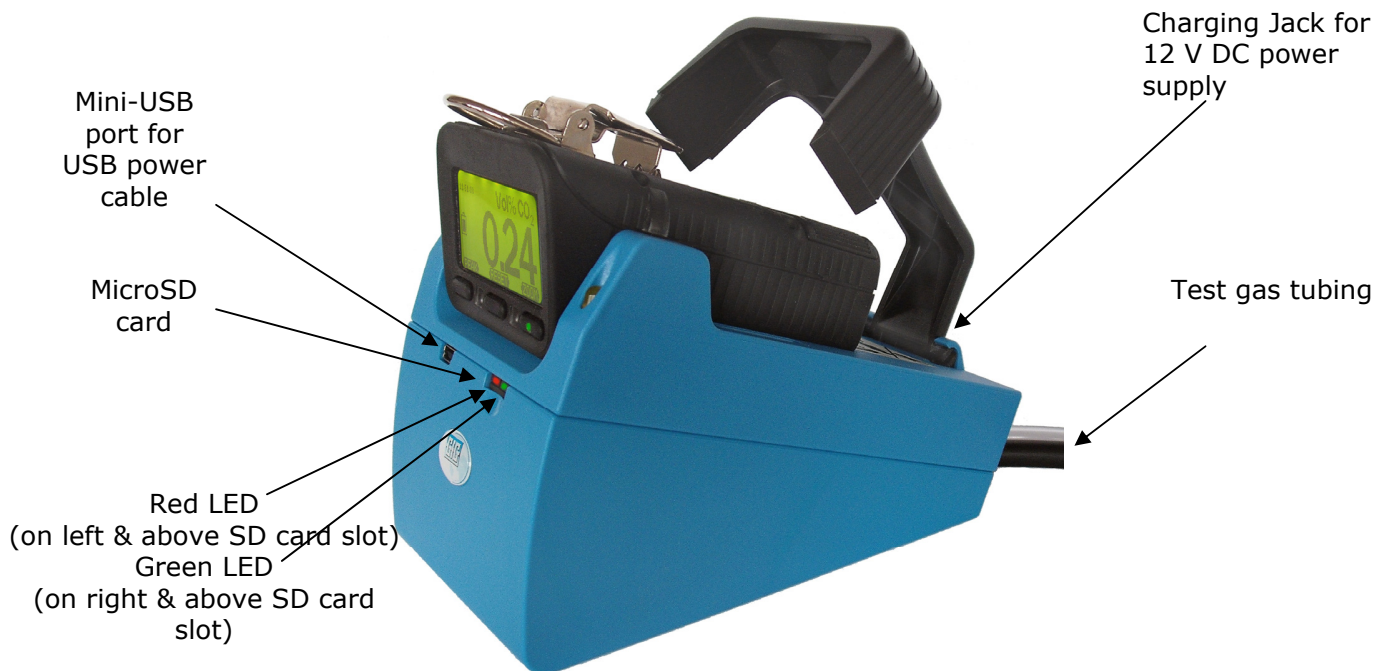
The TS400 Test Station is an automatic test station for carrying out a function test ("bump test") on the sensors of Microtector II Series gas detectors.

## Installing and Connecting the Test Station

During commissioning, the tubing for the test gas supply, gas discharge tubing, power supply (if applicable) and PC interface cable must be connected to the test station.

The test station must be installed on a firm and even surface. The gas must be supplied pressure-free via a gas cylinder regulator with a flow rate of 0.5 l/min. Also ensure that the test gas can exit the test station freely without pressure on the gas outlet tubing!

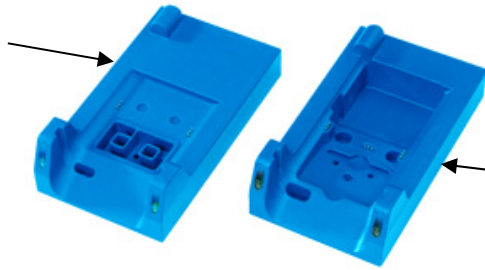
# Connections and Control Elements



## Test Station Versions

Two test station versions are available. One version for detectors without an attached motorized pump, and one for units with an attached motorized pump (G400-MP2). Both versions can also be equipped with an optional charging function. This has the advantage that you can also use the test station for charging the detectors. The motorized pump can remain connected to the detector for all functions.

TS400-1 or  
TS400-DIC1  
for use with  
Microtector II  
without pump



TS400-2 or  
TS400-DIC2  
for use with  
Microtector II with  
pump



## Operation

The test station is operated by means of the control keys on the gas detector. The status and test results are shown on the display of the detector.

The TS400 Test Station is switched on by the connection to the plug-in power supply unit for charging (optional), or by USB connection to a PC for testing. Note: Testing will not initiate if it is connected to the charging supply. After switching on, both LEDs light steadily. A memory test of the TS400 is performed during this time. When the TS400 is ready for operation, the green LED lights up steadily. If the red LED lights up steadily after the memory test, the test station has to be serviced. The test station can be configured for the connected gases and different functions using the configuration software. If a Microtector II Series detector is placed into the test station, it is possible to select "INFOrmation", "Bump **TEST**" or "Auto**CAL** adjustment" using the softkeys on the gas detector.

In order to charge a gas detector, the test station has to have the charging function and be connected to a power supply using the plug-in power supply unit or car adapter. Switch off the gas detector before placing it into the test station for charging.

Note that calibration can only be carried out with the DS400 Docking Station. If a calibration is started in the test station, an error message is displayed and the calibration is aborted. Within the first 10 seconds you can override the automatic selection and start a bump test manually by pressing the right softkey "**TEST**" on the detector. When the green and red LEDs flash simultaneously, the gas supply has to be switched on. The TS400 waits for the gas flow for 30 seconds. If no gas flow is detected during this time, the test is aborted and an error message is displayed. When using a pushbutton type regulator, hold the button on the regulator depressed until the end of the test. When the TS400 has detected the gas flow, the red LED goes out, and the green LED flashes. The gas flow has to be maintained until both LEDs flash again. If the gas supply is interrupted too soon, the test is aborted with an error message and has to be repeated. At the end of the detector test, when the TS400 detects that the gas supply has been switched off, the test result is displayed.

# Charging

Turn the G450 or G460 off before inserting it into the test station. The charging procedure starts automatically. It can charge while having connection to a PC or on it's own.

**Yellow LED**  
**Constantly lit:** Normal charging  
**Flashing:** Trickle charge

**Green LED**  
**ON:** Voltage supply for charging module switched on  
**OFF:** Detector is in the test station and a bump test is being performed



The normal charging process of an empty battery takes approximately 7 hours. After the normal charging process, the detector automatically changes to a trickle charge.

# Bump Test

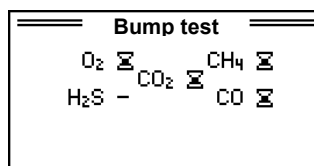
During the bump test, the following points are checked:

- Check visual alarm
- Check audible alarm
- Check response time of sensor for alarm 1 and 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 the micro SD card
- Depending on the configuration, setting of the time in the detector
- Depending on the configuration, setting of the bump test interval in the detector

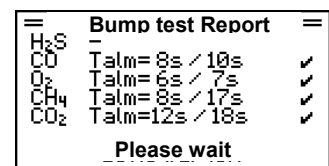
To initiate a bump test, switch on the gas detector and insert it into the test station when the sensor readings are being displayed. The bump test starts automatically after 10 seconds. The effective time for the bump test is approximately 20 seconds. During the test, the relevant test gas is supplied to the sensors. The test progress and the bump test report are shown on the display of the detector.



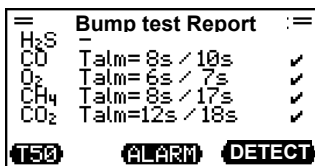
Bump test starts after 10 seconds automatically



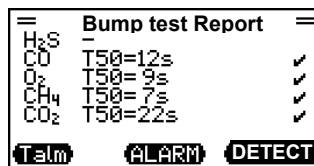
Bump test running



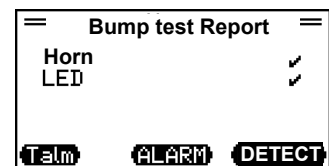
End of the bump test



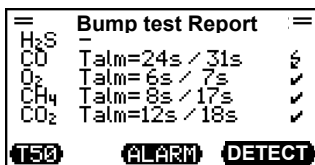
Talm = Response times for alarm 1 and alarm 2 of the respective test gas



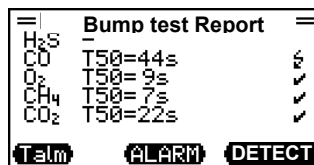
T50 = t50 response time of the respective test gas



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:

-  = In process
- = Sensor not tested
- ✓ = Sensor passed test
- ✗ = Sensor failed test

## 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 above the SD card on the test station using the traffic light principle. If the green LED is lit, the bump test was successful and the detector is ready for use. If the red LED is lit and the display 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 not successful:  
Display is red + red LED lit in slot  
Display of the error which has occurred

## Possible error messages:

- No gas** – TS400 is not configured
- Flow error** – Fault in the test gas supply
- Aborted by detector** – Detector problem / fault
- Time too long** for bump test of the sensors
- Power error** – Fault in supply voltage to TS400 power supply unit

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
- 8 = Gas amount

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

- 3 = 2 + 1 (Gas pressure + SD card)
- 9 = 8 + 1 (Gas amount + SD card)
- 10 = 8 + 2 (Gas amount + gas pressure)



## Data Storage/Data Transfer to a PC

All information about the bump tests of the individual sensors are automatically stored on an SD card (if installed). Data transfer to the PC is performed using the TS400 software reader program when the test station is connected to the PC with the USB cable. The data on the SD card can, however, also be evaluated by means of a card reader, without having the test station connected to a PC.

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
- Gas type
- Detection ranges
- Alarm thresholds: A1, A2, A3, STEL, TWA
- User name

### Test station:

- Date and time
- Mode: Bump test
- Test gas and gas concentration
- Gas cylinder number
- Test result
- Bump test:
  - Horn (audible alarm)
  - LED (visual alarm)
  - $t_{\text{Alarm1}}$
  - $t_{\text{Alarm2}}$
  - $t_{50}$  or  $t_{90}$
- Sensor calibration:
  - Zero point (ZP) before sensor calibration
  - Zero point (ZP) after sensor calibration
  - Sensitivity (CAL) before sensor calibration
  - Sensitivity (CAL) after sensor calibration

**The columns for the sensor calibration are not filled with data when using the TS400 because sensor calibration is only possible with the DS400.**
- TS400 serial no. and name
- TS400 ID
- TS400 software version

# Software

## Installation

Software requires a Windows operating system. Install the program first with the setup program, which is started from the CD. After inserting the CD, the setup program is started automatically. If this does not work, select the relevant CD drive in 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 or select a different path to save the files. The program is then installed on the selected drive and directory. After installation, the program group “GfG TS400” and the icons for starting the program are created.

## Installation of the USB Driver

Connect the mini USB interface cable to your PC. Windows recognizes the new hardware and asks for the driver. The driver is on the CD in the 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 is 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. 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.

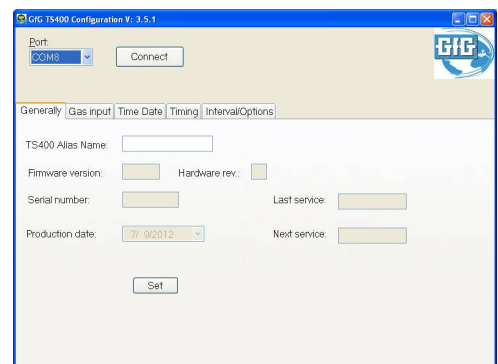
## Configuration of the TS400

The parameters in the test station can be configured using the configuration program TS400Config.EXE. This includes, in particular, setting the correct test gas concentrations to be used by the station for testing.

## Select Port

Click on the arrow under the heading “Port”. A selection list of all the available interfaces appears on the screen. The correct port is normally selected and displayed automatically after the program is started.

Click the button “Connect” to connect the TS400 to the PC.



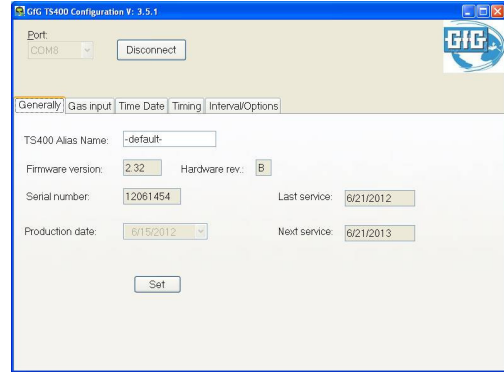
## General

General information of the TS400 can be entered and displayed here.

**TS400Name:** Input of an alternative name for the test station.

In the field "**Last service**" you can see when the TS400 was last serviced.

The field "**Next service**" indicates when the TS400 is to be serviced next.



The screenshot shows the 'GfG TS400 Configuration V. 3.5.1' window. At the top, there is a 'Port' dropdown set to 'COM8' and a 'Disconnect' button. Below this are tabs for 'Generally', 'Gas input', 'Time Date', 'Timing', and 'Interval/Options'. The 'Generally' tab is active, showing fields for 'TS400 Alias Name' (default), 'Firmware version' (2.32), 'Hardware rev.' (B), 'Serial number' (12061454), 'Production date' (6/15/2012), 'Last service' (6/21/2012), and 'Next service' (6/21/2013). A 'Set' button is at the bottom.

**Note:** When this date is reached, the message "TS400 service" appears on the display of the detector. If the date has been exceeded by 21 days, bump tests can no longer be carried out. The tests are aborted and the message "Service TS400 necessary" is displayed. Call the GfG factory.

## Gas input

The connected test gas is specified here. No bump test is possible without this information. Up to six different gases of a test gas mixture can be entered here. Only % vol. or ppm can be selected as units. For combustible gases, the TS400 converts the test gas concentration automatically from % vol. or ppm to % LEL.

### Gas bottle no.:

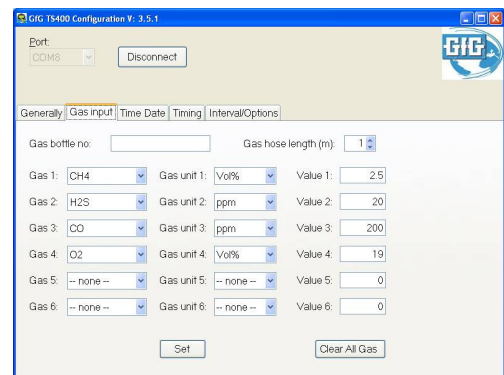
Enter the number or a name for the gas cylinder.

### Gas hose length (m):

Input of the tube length to the gas cylinder necessary.

This configuration program and the test stations accept a wide range of test gas values. The gas detectors require test gases with gas concentrations of 20 % above the set alarm value for alarm 2, and at least 10 % above the alarm value for alarm 1.

After selecting and setting new test gases and test gas concentrations, the connection to the test station must be interrupted by clicking the button "Disconnect". The connection must then be established again by clicking the button "Connect". Now check in the file "Gas" whether the transmitted test gas concentrations correspond to those of the connected test gas cylinder.



The screenshot shows the 'GfG TS400 Configuration V. 3.5.1' window with the 'Gas input' tab selected. It features a 'Gas bottle no.' field and a 'Gas hose length (m)' dropdown set to '1'. Below are six rows for gas configuration: Gas 1 (CH4, Vol%, Value 1: 2.5), Gas 2 (H2S, ppm, Value 2: 20), Gas 3 (CO, ppm, Value 3: 200), Gas 4 (O2, Vol%, Value 4: 19), Gas 5 (none, none, Value 5: 0), and Gas 6 (none, none, Value 6: 0). 'Set' and 'Clear All Gas' buttons are at the bottom.

## Timing

The parameters for the bump test can be changed in this field. The times should be changed, however, only for special applications (e.g. in the case of extreme tube lengths). Insufficient test times could interfere with the performance of the bump test.

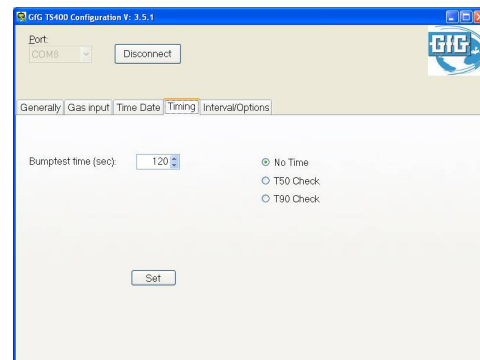
### Bump test time (sec):

Input of the maximum time (seconds) for the bump test

**No Time:** Only the time for Alarm1 and Alarm2 is tested

**T50 check:** Test of Alarm1, 2 and the response time  $t_{50}$

**T90 check:** Test of Alarm1, 2 and the response time  $t_{90}$

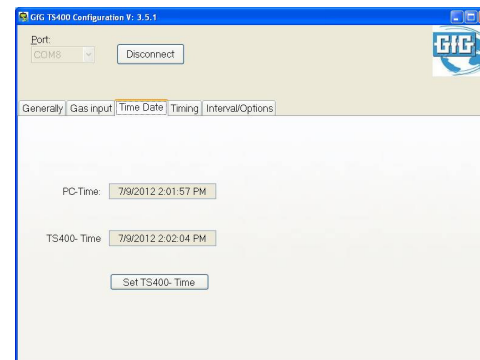


## Time Date

Time and date for the TS400 are set here. The time is set automatically if the difference is more than 10 seconds.

**Note:** Date and time are saved in the log file on the SD card during the bump test. Ensure that the PC clock is set correctly.

There is no automatic changeover for daylight savings time.



## Interval/Options

The intervals for the bump test are set under this tab.

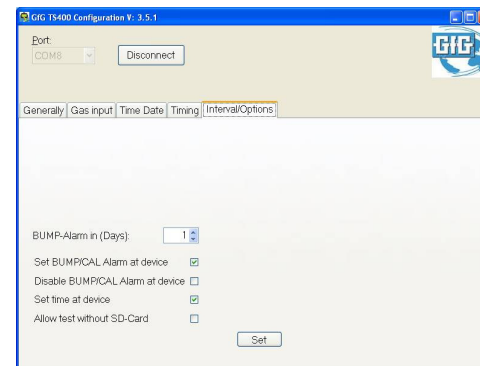
Transfer of intervals:

The intervals can automatically be transferred to the gas detectors of the G400 Series. If these intervals are exceeded, a message is displayed when the detector is switched on. This message can be acknowledged. With the field "Set BUMP/CAL Alarm at device" you can determine whether or not the set intervals are to be transferred with each bump test.

**BUMP-Alarm in (Days):** A check of the setting for the bump test interval is recommended every working day. In the field "BUMP-Alarm in (Days)" you can set the number of days after which the detector demands a bump test. If the value is set to 0 days, no bump test is demanded by the detector.

The intervals for the bump test are no alternative to the annual inspection of the gas detector by an expert; see also operating manual of the Microtector II gas detector.

With the field "Set time at device" you can determine whether the date and time in the detector are to be set to date and time of the test station.



# Annex

## Care

Dirt on the test station housing can be removed using a cloth dampened with water. **Do not use solvents or cleaning agents!**

## Maintenance and Inspection

We recommend regular inspection of the tubing connections. In addition, an annual inspection by an expert is recommended.

## Faults: Causes and Remedies

	<b>Fault / message</b>	<b>Cause</b>	<b>Remedy</b>
1.	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 - Contact GfG Service, if necessary
2.	"Aborted by detector!"	Fault in gas detector	- Switch TS400 and detector off and on again Repeat the procedure
3.	"TS400 parameter error!"	Error in parameter main memory	- Switch detector off and on again Reconfigure, if necessary - Contact GfG Service, if necessary
4.	"Flow error!"	Fault in the gas supply	- Open valve of the test gas cylinder - Remedy interruption in the test gas supply - Contact GfG Service, if necessary
5.	"No gas"	TS400 is not configured or error in parameter memory	- Configure TS400 - Contact GfG Service, if necessary
6.	"No SD card!"	SD card not inserted or cannot be written	- Insert or replace SD card
7.	"Power error!"	Fault in operating voltage of the TS400	- Replace plug-in power supply unit - Contact GfG Service, if necessary
8.	"TS400 service due"	Service date exceeded or clock incorrect or not set	- Contact GfG Service
9.	"Time too long!"	Bump test of the sensors taking too long	- Check gas supply
10.	INFO "Gas pressure!"	Gas pressure too low if external gas pressure switch is installed	- Check test gas cylinder and replace, if necessary
11.	INFO "Gas amount!"	Test gas cylinder almost empty	- Replace test gas cylinder and reset with the configuration program
12.	INFO "TS400 service necessary!"	Service date has been exceeded by max. 21 days	- Contact GfG Service

## Accessories and Spare Parts

Description	Order No.
6' mini USB interface cable for data transmission PC <--> TS400	1450-600
12' mini USB interface cable for data transmission PC<-->TS400	1450-610
G400-PS2 plug-in power supply unit for TS400	4001-650
Push button regulator for TS400	2603-400
Micro SD memory card for archiving instrument-specific test data and test routines, different storage capacities	1450430
TS400 Manual	7004-400
Software CD- Database software for automatic storage of instrument data, tests, test dates and test routines.	3005-400

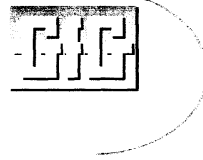
## Technical Data

<b>Type designation:</b>	<b>TS400</b>
<b>Display and control elements:</b>	Round LEDs (green, yellow, red) for status of the charging function Square LEDs (green, red) for status of the bump test Display and 3 buttons on G450/G460 for result of the bump test
<b>Power supply:</b>	12 VDC / 500 mA via jack (charging option only) or 5 VDC / 100 mA via USB port
<b>Gas</b> Connections: Flow rate:	1 test gas inlet, 1 gas outlet (for hose di≈5 mm) 0.5 - 0.6 l/min
<b>Time</b> Bump test:	20 - 30 sec. (depending on setting and test gas concentration)
<b>Data</b> Storage medium: Communication:	MicroSD card (formatted with FAT 32 or FAT16 file system) Mini USB
<b>Housing</b> Protection class: Material: Dimensions: Weight:	IP20 Plastic 5.54x4.72x6.30 inches (WxHxD) (90x120x160 mm) 10.58 oz. (300 g)

## EG- Konformitätserklärung **GfG Gesellschaft für Gerätebau mbH**

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TS 400**

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Erstellt: 06.09.2011 Geändert:

[www.gfg.biz](http://www.gfg.biz)

Die GfG Gesellschaft für Gerätebau mbH entwickelt, produziert und vertreibt Gassensoren und Gaswarnanlagen unter Anwendung eines **Qualitätsmanagementsystems** nach DIN EN ISO 9001.

Überwacht wird die Produktion von elektrischen Betriebsmitteln der Gerätegruppen I und II, Kategorien M1, M2, 1G und 2G für Gassensoren, Gasmessgeräte, Gaswarnanlagen in den Zündschutzarten Druckfeste Kapselung, Erhöhte Sicherheit, Vergusskapselung und Eigensicherheit mit deren Messfunktion mit Hilfe eines **Qualitätssicherungssystems** – Zertifikats-Nr. BVS 03 ATEX ZQS / E 187 - durch die benannte Stelle, DEKRA EXAM GmbH.

Die Teststation **TS 400** entspricht der **Richtlinie 2004/108/EG** für die elektromagnetische Verträglichkeit.

Die Richtlinie wurden unter Berücksichtigung der folgenden Norm eingehalten:

- **Elektromagnetische Verträglichkeit**

-Elektrische Betriebsmittel für Leittechnik und Laboreinsatz – EMV Anforderungen.

EN 61326: 2006

Störaussendung Klasse A

Störfestigkeit Klasse B

Mit der Prüfung und Bewertung der elektromagnetischen Verträglichkeit wurde das EMV Messlabor EM TEST GmbH, Kamen beauftragt.

Die Sicherheitshinweise in der Bedienungsanleitung 211-200.24 sind zu beachten.

Dortmund, den 16.09.2011

.....  
Dipl. Kfm. H.J. Hübner  
Geschäftsführer



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GfG reserves the right to change part numbers, prices  
and/or technical information without notice.  
7004-400 Rev. 5 (October 2013)