



User Manual

WOW! Emission WGA3



1 Introduction

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The target group is users with previous technical knowledge in the field of automotive test technology.

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Use

The WOW! WGA3 is used to measure vehicle exhaust gases and to monitor the exhaust-gas-relevant components in the engine.

The main products of the combustion of fuel with air in a spark-ignition engine are carbon dioxide (CO₂) and water. Unwanted by-products are carbon monoxide (CO), nitrogen oxides (NO_x) and hydrocarbons (HC). Exhaust gas also contains a residual amount of unburned oxygen.

Carbon monoxide (CO) is absorbed into the blood instead of oxygen and acts as a toxin. Nitrogen oxide (NO) is also toxic and is primarily responsible for the creation of smog. It is created when the nitrogen in the air reacts with oxygen at high temperatures. NO reacts very quickly with air to create NO₂ and other nitrogen oxides. These are referred to as NO_x. Hydrocarbons are incompletely combusted fuel. Carbon dioxide (CO₂) is a product of the complete combustion of fuel. It has an asphyxiating effect in high concentrations. The aim of exhaust gas measurement is to reduce the toxins and environmental toxins to a minimum and to optimise combustion inside the engine. This is accompanied by an optimisation of combustion and a reduction in fuel consumption.

In addition, the Emission exhaust gas testing system allows the vehicle's engine speed and oil temperature to be measured, by means of which the engine's operating state can be recorded.

User groups

The WOW! WGA3 has been developed for trained specialist personnel in the automotive industry. For your own safety and to avoid damage to the device caused by incorrect handling, it is essential to read through this User Manual carefully before using the device for the first time.

Calibration requirement

The WGA3 is approved in accordance with MID (Measurement Instrument Directive) on the basis of European Directive 2004/22/EC by the Physikalisch-Technische Bundesanstalt (PTB) (German institute for science and technology for metrology and physical safety engineering).

The WOW! WGA3 is subject to the calibration requirement for exhaust gas measuring devices and must in accordance with the legislation be calibrated once a year by the relevant calibration authority.

Manufacturer:

WOW! Würth Online World GmbH

Schliffenstrasse / Falkhof

D-74653 Künzelsau

Telephone: (+497940) 15-1770

E-mail: info@wow-portal.com

Fax: (+497940) 15-3299

Internet: www.wow-portal.com

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1.2 Safety instructions

This section contains information on protecting devices and vehicle components.

System voltages and high voltages

The mains system network and electrical systems in motor vehicles are subject to hazardous voltages. Personnel are exposed to the risk of electric shock through contact with parts to which a voltage is applied (e.g. ignition coil) and through flashovers caused by damaged insulation (e.g. rodent bites in ignition cables). This applies to the secondary and primary sides of the ignition system, the wiring harness with plug connections, lighting systems, and the connections/terminals of test devices.

⚠ SAFETY PRECAUTIONS:

- Connect the Emission exhaust gas system only to a correctly earthed grounding-type socket-outlet (see also information on the back of the exhaust gas measuring cell).
- Use only the power supply cord provided.
- Use only extension leads with earthing contacts, do not use cable drums (self-induction/coil principle).
- Replace cables which have damaged insulation.
- Connect the Emission exhaust gas system to the mains system network before connecting to a Vehicle and switch on.
- Carry out interventions on the electrical systems of vehicles only when the ignition has been turned off. Such interventions include, for example, connecting devices, replacing ignition system parts, removing assemblies (e.g. alternators), connecting assemblies on a test bench, etc.
- Perform testing and adjusting operations if possible only with the ignition turned off and the engine stopped.
- Do not touch any live parts when performing testing and adjusting operations with the ignition turned on or while the engine is running. This applies to all the connecting cables of the Emission exhaust gas system and the terminals/connections of assemblies on test benches.
- Complete test connections only with matching connecting elements (e.g. vehicle-specific adapter leads).
- Snap test plug connections correctly into place and ensure that the connections are firmly seated.

Danger of burning the respiratory organs

Exhaust gas measurement involves the use of exhaust gas sampling hoses which, if heated to temperatures in excess of 250 °C or in the event of a fire, release a highly caustic gas (hydrogen fluoride) which can burn the respiratory organs.

⚠ SAFETY PRECAUTIONS:

- Seek immediate medical attention if such gases are inhaled!
- Wear neoprene or PVC gloves when removing combustion residues.
- Neutralise burning residues with calcium hydroxide solution. This creates non-toxic calcium fluoride, which can then be rinsed off.

Danger of burning

Acids and alkalis cause serious burns to unprotected skin, hydrogen fluoride together with moisture (water) forms hydrofluoric acid. Condensate which collects in the sampling hose is also acidic. Bear in mind when replacing the oxygen sensor that the sensor contains an alkaline solution.

⚠ SAFETY PRECAUTIONS:

- Wash areas of burned skin immediately with water, then seek medical attention!

Danger of asphyxiation

Vehicle exhaust gases contain carbon monoxide (CO), a gas which is both colourless and odourless. Carbon monoxide, if inhaled, causes an oxygen deficiency in the body. Particular care must be exercised when working in pits, since some exhaust gas constituents are heavier than air and will settle at the bottom of the pit. Caution is also advised when working on vehicles with LPG systems.

⚠ SAFETY PRECAUTIONS:

- Always ensure that appropriate ventilation and fume extraction is provided (particularly in pits).
- Switch on the extractor system in closed rooms.

Danger of injury and crushing

Vehicles which have not been secured against rolling expose personnel to, for example, the risk of being crushed against a workbench. Engines which are running and also those which are stopped have rotating and moving parts (e.g. belt drives) which can cause injuries to fingers and arms. Electrically powered fans are particularly subject to the risk of starting up unexpectedly when the engine is stopped and with the ignition turned off.

⚠ SAFETY PRECAUTIONS:

- Secure the vehicle against rolling, place automatic transmissions in Park, place manual gearboxes in Neutral, apply the handbrake, block the wheels with chocks.
- Do not reach into areas with rotating/moving parts while the engine is running.
- Before working on or in the vicinity of electrically powered fans, allow the engine to cool down and pull the fan motor plug.
- Do not lay connecting cables from the Emission exhaust gas system in the area of rotating parts.

Danger of burning

Personnel working on hot engines are exposed to the risk of burning e.g. by exhaust manifolds, exhaust turbochargers, oxygen sensors, etc. These components can reach temperatures of several hundred °C. Depending on the duration of the exhaust gas measurement, the sampling sensor of the exhaust gas measuring cell can also become extremely hot.

⚠ SAFETY PRECAUTIONS:

- Wear protective clothing/equipment, e.g. gloves.
- Allow the engine to cool down (also applicable to independent heating).
- Do not lay connecting cables of test equipment on or near hot parts.
- Do not allow the engine to run for longer than is necessary for testing/setting.

Noise

The noise emission values of the exhaust gas measuring cell are less than 70 dB(A) in the area of the operating personnel's workbays.

Measurements on vehicles can give rise, particularly at high engine speeds, to noise levels in excess of 70 dB(A). Prolonged exposure to such high noise levels can lead to hearing damage.

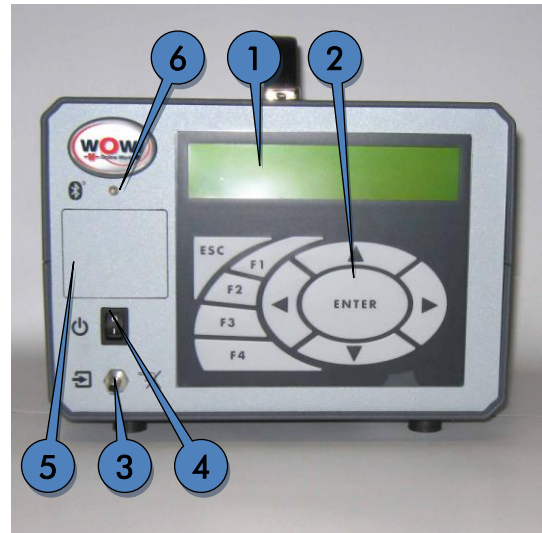
⚠ SAFETY PRECAUTIONS:

- The owner must if necessary protect the workbays in the vicinity of the test location against noise.
- The operator must if necessary use personal sound insulation equipment.

2 Description of Device

2.1 Front view

No.	Description
1	Display
2	Keypad
3	Exhaust gas inlet
4	Main switch ON/OFF
5	Servicing stamp position
6	Green/blue LED, see also Interfaces

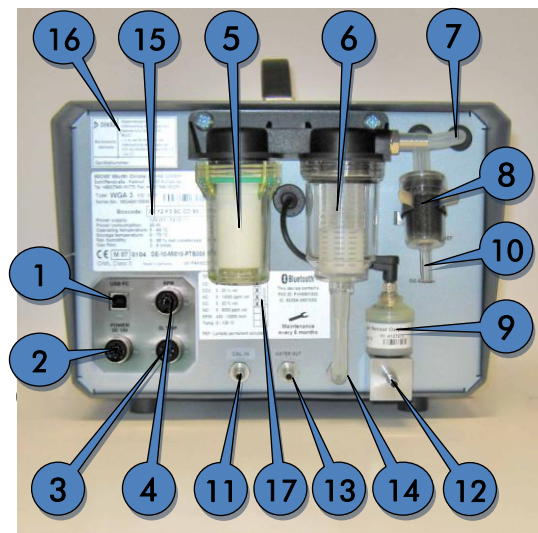


Description of function keys

Keys	Function
▶ ◀	Cursor left/right or jump into the decimal positions
▲ ▼	Cursor up/down or enter numerical values
ENTER	Confirm
ESC	Back
F1	Function keys are described in the menu
F2	
F3	
F4	

2.2 Rear view

No.	Designation	Connection
1	USB-PC	PC connection via USB
2	Power – DC12V	Power supply
3	Temp	Oil temperature measurement (optional)
4	RPM	Engine speed measurement (optional)
5	Fine filter	
6	Coarse filter	
7	Filter housing, exhaust gas inlet	
8	Carbon canister	
9	Oxygen (O2) sensor	
10	Zero gas inlet reference (REF)	
11	Calibrating gas inlet (CAL IN)	
12	Gas outlet (GAS OUT)	
13	Water outlet (WATER OUT)	
14	Water inlet (WATER IN)	
15	Nameplate with MID number and box code	
16	Approval label, exhaust emissions test	
17	Technical data	



2.3 Switching on

Connect the WGA3 via the power pack to the power supply.
Operate the ON/OFF switch.

3 Menu Structure

3.1 Operating the WGA3

```
> Measuring mode
  Settings
  Versions
  Maintenance
```

- Navigation in the menu is performed with the arrow keys ▶◀▼▲. Confirm your selection in each case with **ENTER**
- The cursor position is indicated by ">".

NOTE:
The menu can contain more lines than are shown in the display. These extra lines can be selected by scrolling with the arrow keys ▼▲.

- Use the **ESC** key to jump one step back or cancel a function.

```
>> Capture system : Clip-on trigger
                      sensor
```

- In lines in which a ">" already precedes ">> Capture system", it is possible to make an input or start an action.
Press **ENTER** and select the desired settings with ▲▼.

3.2 Measuring mode

```
> Measuring mode
  Settings
  Versions
  Maintenance
```

The main menu appears after the device has been switched on. It takes approx. 30 seconds for the WGA3 to warm up.

```
CO  0.000 % vol   | CO2 0.00 % vol
HC  0      ppm vol | O2  21.10 % vol
LAMBDA ----      | PEF 0.523
RPM 0       1/min  | Temp 80 °C
```

The measured values are displayed and the device is ready for use.

PEF P.E. Factor

The P.E.F. is permanently calculated by the measuring bench. It can be between 0.470 and 0.585. The current P.E.F. is displayed in the measuring mode window at bottom right and read out directly from the measuring bench.

3.2.1 Function menu

Calling up the function menu

Press the **F2** function key in measuring mode to access the function menu. Here you can call up function that you required for the relevant operating mode.

Settings in the function menu

```
>Engine speed registration ▲
  Fuel type
  Zero gas
  Rinse ▼
```

Selection of engine speed registration via

```
↳ >>Capture system : Clip-on trigger sensor
  >Operation : 4-stroke
  >Pulse rate : 1
```

- Clip-on trigger sensor
- Pickup clamp
- TD/TN signal
- Magnetic Sensor

```
↳ >Capture system : Clip-on trigger sensor
  >>Operation : 4-stroke
  >Pulse rate : 1
```

Selection of operating principle

- 4-stroke
- 2-stroke

```
↳ >Capture system : Clip-on trigger sensor
  >Operation : 4-stroke
  >>Pulse rate : 1
```

Setting of pulse rate

- Speed pulses per crankshaft revolution

Fuel type

```
>Fuel type ▲
Zero gas
Rinse
Leak test
```

```
↳ >Normal ▲
Super 95
Super Plus 98
Liquefied petroleum gas ▼
```

Selection of fuel type.

Back with ESC

Zero gas

```
>Zero gas ▲
Rinse
Leak test
Pump on/off ▼
```

Zero calibration is automatically carried out before the start of each measurement. The device adapts itself to the ambient air in the process. The measuring channels HC, CO and CO2 are set to 0 % vol and O2 to 20.93 %. Zero gas calibration can be started here manually.

```
↳ >Zero gas calibration. Please wait...
GAS          Set      Actual
CO [% full]  0.000  0.000
CO2 [% full] 0.00   0.00
```

Back with >ESC<

Rinse

```
>Rinse ▲
Leak test
Pump on/off
Operating status ▼
```

The WGA3 is rinsed with fresh air.

```
↳ Device is rinsing
End by pressing >ENTER<
```

Back with ENTER

Leak test

```
>Leak test ▲
Pump on/off
Operating status
Display negative values ▼
```

Leak test
The leak test is automatically requested every 24 hours by the device. No measurement can be taken if the leak test has not been passed.

```
↳ Leak test - seal tube system!
Continue by pressing >ENTER<
Cancel with >ESC<
```

The leak test can also be started manually. Please follow the instructions in the display.

```
Leak test active!
Please wait ...
DvP      :-450.7 mbar
DnP      : 969.3 mbar
```

NOTE:
DvP: Pressure before pump
(relative pump vacuum)

```
Leak test passed!
Remove seal
```

DnP: Pressure after pump
(atmospheric pressure with
pump gauge pressure)

```
Gas conduit system leaky!
Remove seal
```

If the leak test is not passed,
please eliminate the error/fault
and carry out the leak test again.

```
Error no.: U168
Measuring bench error: Low pressure in
system very high, examine flexible tube
line or filter and clean, if required!
```

Observe error message.

Pump on/off

```
Leak test ▲
>Pump on/off
Operating status ▼
Display negative values
```

Only required in the event of
servicing by a technician.
Pump is automatically monitored
in measuring mode.

Display negative values

```
Leak test ▲
Pump on/off
Operating status
>Display negative values ▼
```

Only required in the event of
servicing by a technician.

3.3 Settings

```

Measuring mode
> Settings
  Versions
  Maintenance
    
```

The device-specific settings are made in Settings.

Time/Date

```

>Time/Date ▲
  System data
  Interfaces
  LCD (Display) ▼
    
```

```

Warning: Data change could
require a test gas calibration!
>>Date : 02.12.2010
>Time : 11:48:30
    
```

Select the value to be changed and press **ENTER**.
 Make the changes and confirm with **ENTER**.
 Back with **ESC**.

System data

```

Time/Date ▲
>System data
  Interfaces
  LCD (Display) ▼
    
```

System-specific values are displayed here.
 Changes cannot be made.

```

>Constants
Next gas calibration : 17.08.2011
Next maintenance : 15.02.2011
Device number : WGA0010006
    
```

>Exhaust gas values
 >Is automatically set
 >Is automatically set
 >As on nameplate

Interfaces

```

Time/Date ▲
System data
>Interfaces
  LCD (Display) ▼
    
```

Set up the connection to the computer being used here.
 The WGA3 can be connected by cable (USB) or Bluetooth to the computer.

```

>>PC communication : Bluetooth
                        USB
    
```

Blue = Bluetooth
 Green = USB
 See also Settings in the WOW software.



LCD (Display)

```
Time/Date ▲
System data
Interfaces
>LCD (Display) ▼
```

Setting of LCD display

Confirm the adaptations with
ENTER

```
>>Contrast (0-17) : 3
>Brightness (0-17) : 7
```

NOTE
If the contrast and brightness values are changed, they are adapted only after the menu has been exited.

3.4 Version

```

Measuring mode
Settings
> Versions
Maintenance
    
```

The different version states can be checked in succession and software updates made in the Version menu.

Update

```

└─> >Update
    View Logbooks
    Version application
    Version package
    
```

Updates are transmitted by an external computer to an internal buffer of the WGA3. The new software is updated in the WGA3 only when it has been confirmed.

```

>Update
Update of internal flash
Update-Check
    
```

First connect the WGA3 via a USB cable to the computer from which the update is to be loaded.

If necessary, change the interfaces to **USB** in Settings.

See [Interfaces](#)

NOTE!
For security reasons, updates are only possible via USB (cable connection!).
The update process must **not** be interrupted!

Update of internal flash

```

└─> Update
    >Update of internal flash
    Update-Check
    
```

The last Software version is in the buffer and can be updated again within the WGA3.

```

>>Start update
-----
Update can be carried out
When the system is not running
    
```

Start with **ENTER**.

Please follow the instructions in the LCD display.

```

Update process successfully completed!
Please restart the device!
    
```

Now switch off the device at the main switch.

IMPORTANT!
Please wait 5 seconds and then switch back on

Update-Check

```

Update
Update of internal flash
>Update-Check

0 of 19 files are missing,
or are defective.
File check has been completed
to continue >ENTER<
    
```

Update-Check is used to check whether all the contained files have been fully and correctly installed.

Start the function with >ENTER<

The update must be carried out again if files are missing (example: 2 of 19) after the check.

View Logbooks

```

Update
>View Logbooks
Version application
Version package
    
```

The current version states of the software and hardware can be read out in these menus.

This menu is of relevance solely to service technicians and the calibration inspector.

3.5 Maintenance menu

```

Measuring mode
Settings
Versions
> Maintenance
    
```

Test gas calibration

```

>Test gas calibration
Leak test
Service
RPM/TEMP
    
```

NOTE: Test gas calibration may only be carried out by an authorised person.

```

>>Password :5555
>Start test gas calibration
-----
Start only by authorized person!
    
```

NOTE: In order to achieve the maximum accuracy, the device must be switched on for at least 30 minutes.

```

> Values with data on test gas
  compare and correct if necessary!
  Continue with >F4<
>>CO      [% full] :          3.500
    
```

Enter the password.

Scroll down with ▼ and compare the values with those of the test gas bottle.

Correct these accordingly. Continue with F4.

```

Leak test - seal tube system!
Continue by pressing >ENTER<
Cancel with >ESC<
    
```

Carry out the leak test.

[See Leak test](#)

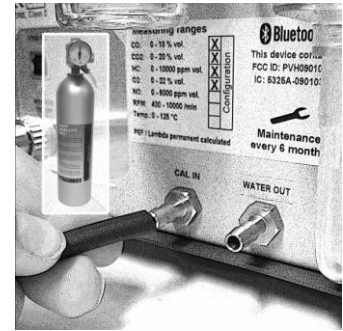
```
>Zero gas calibration. Please wait...
GAS          Set      Actual
CO [% full]  0.000  0.000
CO2 [% full] 0.00   0.00
```

```
Connect test gas bottle
Continue with >ENTER<
Stop with >ESC<
```

```
Set pressure test gas!
Pressure range: 969.1 - 979.1
Current value : 965.2 mbar
```

```
Adjustment completed! Continue >ENTER<
CO2 13.61 % full | Propane 1822 ppm.vol
CO  3.493 % full | PEF      0.508
O2  0.01 % full  | Pressure 972.5 mbar
```

```
Adjustment successfully completed!
Turn off gas bottle
Continue by pressing >ENTER<
```



Carefully open the valve on the pressure gauge of the test gas bottle and set the required test pressure (see **Actual value**).

The instantaneously measured values are shown in the display. The result is displayed.

Remove the test gas bottle from the WGA3

Leak test

```
Test gas calibration
>Leak test
Service
RPM/TEMP
```

Start manual Leak test. See [Leak test](#)

Service

```
Test gas calibration
Leak test
>Service
RPM/TEMP
```

This menu is of relevance solely to service technicians and the calibration inspector.

RPM/TEMP

```
Test gas calibration
Leak test
Service
>RPM/TEMP
```

The values currently measured via the DTB - engine speed and engine temperature - can be displayed in this menu.

4 Maintenance

4.1 General information on maintenance

The WGA3 must be maintained/serviced on a regular basis. The maintenance must be carried out every 6 months.

The device must be calibrated once a year with test gas (see [Test gas calibration](#)).

A visual inspection must be conducted every day.

- The maintenance must be carried out by an authorised expert.
- Only original spare and wearing parts may be used for maintenance purposes. These can be obtained exclusively from the device manufacturer.
- The User Manual must be carefully kept with the WGA3 exhaust gas device.
- The maintenance verifications must be filed in the maintenance handbook. These must be kept for a period of five years.
- The maintenance handbook must be submitted upon request to the calibration inspector for inspection.

⚠ **WARNING:**

Do not inject compressed air into any of the inlets!

4.1.1 Work instructions every 180 days

- Switch off the WGA3 at the main switch on the front.
- Visually inspect the sampling sensor and the hose.
Check the sampling sensor and the hose for fouling and damage and clean if necessary.
- Check the leak test seal for damage. Clean the exhaust gas hose with compressed air.

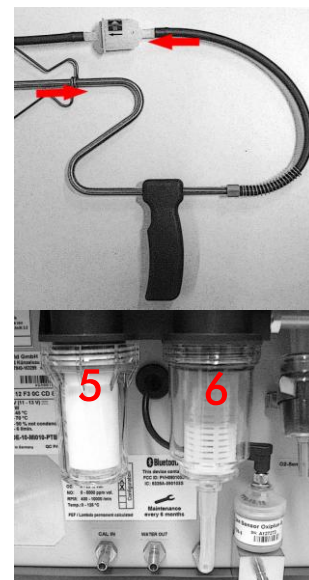
⚠ **IMPORTANT!**

To do so, remove the hose from the WGA3 and the exhaust gas sensor.

- Replace the bag filter in the exhaust gas sampling hose.
Please observe the direction of flow of the filter.
- Replace fine filter **5**.
Please use only the provided filter key to open the filter housing.
 - Clean the filter housing with a clean cloth.
 - Tighten the filter housing hand-tight only.
- Clean coarse filter **6**, replace if necessary.
- Please use only the provided filter key to open the filter housing.
 - Clean the metal filter. Replace if heavily fouled.
 - Clean the filter housing with a clean cloth.
 - Tighten the filter housing hand-tight only.

Visual inspection

- Check that all plug connections / cable connections are firmly seated.
- Check all cables for damage.
Replace damaged cables and plugs.
- Print out the maintenance verification using the WOW! software.
File the printed maintenance verification in the maintenance handbook.



4.1.2 Additionally every 360 days

Checking the error message "*Measuring bench vacuum too high*"

- Plug in the mains power cable and switch on the device.



```
Half year maintenance successfully!
Maintenance performed?
Yes  >ENTER<
No   >ESC<
```

Confirm the message with "**YES**"
>ENTER<.



```
Leak test - seal tube system!
Continue by pressing >ENTER<
Cancel with >ESC<
```

Carry out the [Leak test](#)



```
>Zero gas calibration. Please wait...
GAS          Set      Actual
CO [% full]  0.000  0.000
CO2 [% full] 0.00   0.00
```

The device automatically goes into measuring mode after zero gas calibration has been completed.



```
CO 0.000 % vol | CO2 0.00 % vol
HC 0      ppm vol | O2 21.10 % vol
LAMBDA ---- | PEF 0.523
RPM 0      1/min | Temp 80 °C
```

Now pressure-test the exhaust gas hose with the pump running. After a short time the following error messages appear:



```
Error no.: U162
Measuring bench error: Low pressure in
system too high, examine flexible
tube line or filter and clean, if
```

Delete this message with the
>ESC< key.

5 Settings in the WOW! Software

To be able to use the WGA3 for exhaust emissions testing in conjunction with the WOW! software, you must set up the connection to the WGA3 in the software program settings.

Set the connection type for the WGA3 to Bluetooth. See [Interfaces](#).

In the WOW! software the WGA3 must then be selected and the box code entered. This can be found on the nameplate.

See also the software manual.

6 WGA3 Operating Program (Motorcycle Exhaust Emission Test)

The WGA3 operating program serves to control the WGA3 exhaust gas measurement device via a PC. (Only in conjunction with motorcycle exhaust emission test.)

If you are using the WGA3 in conjunction with a WOW! Emission system, the WGA3 is controlled via the WOW! software 4.x or 5.x.

6.1 Installing the operating program

1. Insert the supplied CD WOW! WGA3 in the CD-ROM drive. The installation program starts automatically. The software is available for downloading on our home page.
www.wow-portal.com > Service > Treiber und Programme
2. Click on Install and on Close when the button changes.
3. Start the WGA3 operating program via the Start menu Start/Programs/WOW!/WGA.

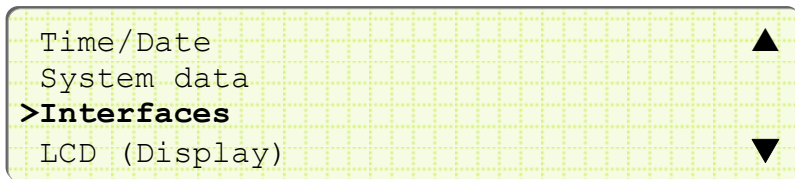
6.2 Interfaces to the PC

The WGA3 can be connected by USB cable or Bluetooth to the PC. Set the connection type first on the WGA3. Switch on the WGA3 at the main switch on the front.

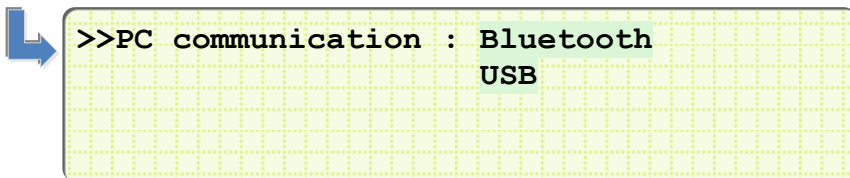


The device-specific settings are made in Settings.

Interfaces



Set the connection to the PC being used here.



The LED indicates the set connection type

Blue = Bluetooth
Green = USB

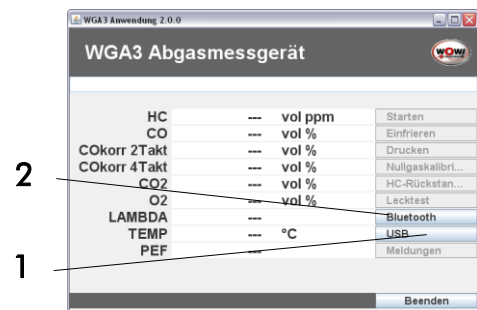


USB:

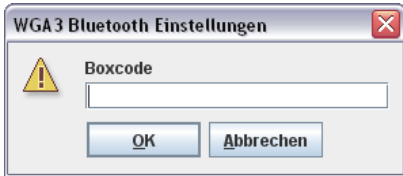
Connect the WGA3 via a USB cable to the PC and then click on (1) **USB**.

Bluetooth:

Click on (2) **Bluetooth** and then enter the box code.



The box code is printed on the nameplate of the WGA3 (3).



Make sure the spelling is correct.



6.3 Operating program

The operating program is self-explanatory and easy to use.

Please always refer to the (1) **command line** at the top in the program; this is where the current status and the necessary operator steps are displayed, e.g. a due leak test or a zero gas calibration.

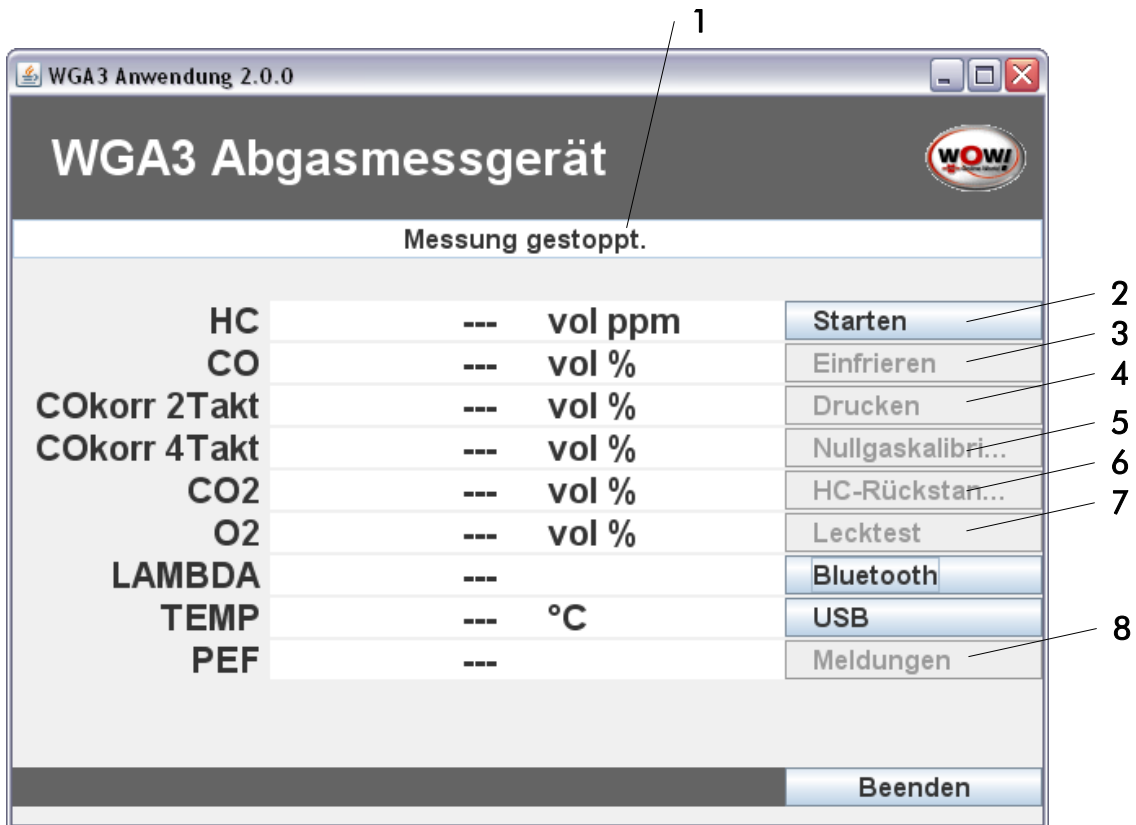
Start the measurement by selecting (2) **Start**.

Select (3) **Freeze** to freeze the current measured values.

Select (4) **Print** to print out the current measured values.

You will be prompted via the (1) **command line** to perform a (7) **leak test**, (5) **zero calibration** or (6) **HC residue test**.

Error messages from the WGA3 can be called up via (8) **Messages**.



For further information on the WGA3, please also refer to the **WGA3 Manual**.

7 Replacing the O2 Sensor

The O2 sensor must be replaced no later than when the device prompts you to do so.

```
>Error no: U35
The O2 sensor voltage is too low!
Please replace the O2 sensor soon.
```

Preconditions for replacing the O2 sensor:

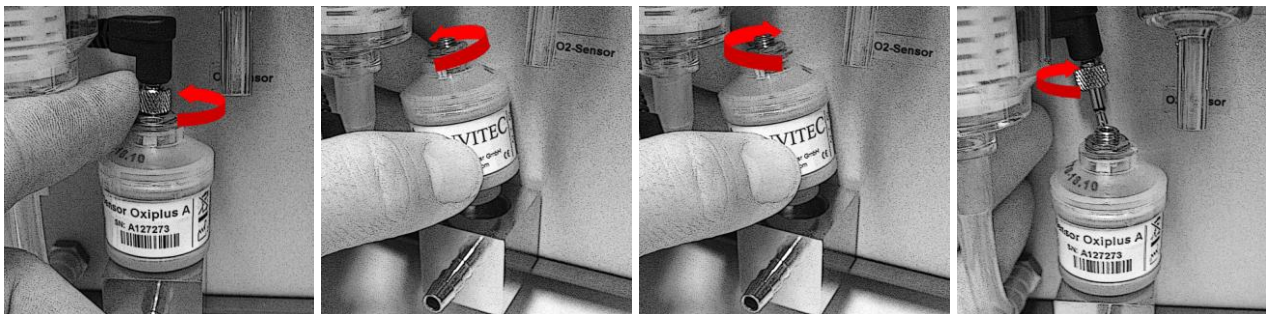
- Coarse and fine filters must be cleaned or replaced.

Procedure:

- Switch off the device at the main switch.

NOTE!

Because the O2 sensor is an integral part of the test, only original replacement sensors may be fitted. See [Spare parts and accessories](#)



IMPORTANT!

Tighten the O2 sensor hand-tight only.
Make sure that the O-ring for the seal is in place.

```
>Zero gas calibration. Please wait...
GAS          Set      Actual
CO [% full]  0.000  0.000
CO2 [% full] 0.00   0.00
```

Switch on the device, zero gas calibration is carried out.

8 Calibration

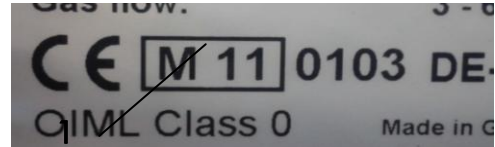
8.1 Information on initial calibration MID

The WGA3 is approved in accordance with MID (Measurement Instrument Directive) on the basis of European Directive 2004/22/EC by the Physikalisch-Technische Bundesanstalt (PTB) (German institute for science and technology for metrology and physical safety engineering).

The nameplate of the WGA3 contains the mark of conformity with the year of initial calibration (after M in the square box).

The WGA3 was checked for conformity by the gauging office and then sealed.

The exhaust gas measurement device (example: ABB.1) was initially calibrated in 2011 and therefore has calibration validity until the end of 2012.



8.2 Recalibration

Recalibration must be performed by a German calibration agency or by an officially recognised inspection agency. Here the national symbols for recalibration are incorporated in addition to the MID identification.

Perform the following checks:

- Check that the device matches the design by referring to the available type approval and visually inspect for completeness and integrity of the calibration seals.
- Check the service documents to be kept by the user.
- In the case of replaced constructional units, the parts used must conform to the design requirements.
- Check that there are instructions for use.
- If necessary, seal the device at the designated points.
- Check that the device matches approval-conforming software versions and checksums.
- If test is successfully passed: Apply the main stamp at the point designated in the type approval.

9 Technical Data

Gas analysis			
CO, CO ₂ , HC	NDIR procedure		
O ₂	Electrochemical sensor		
Measuring bench manufacturer	LumaSense Technologies		
Type designation	Andros Model 6500, BAR-97 compliant		
Warm-up time	< 1 minute, typ. 30 secs.		
Reaction time CO, CO ₂ , HC	< 15 secs. at sensor inlet		
Gas flow rate	3 ... 6 l/min		
Calibration	Annually		
Type approval			
MID (Measurement Instruments Directive 2004/22/EC by the Physikalisch-Technische Bundesanstalt PTB)			
Accuracy class			
Class 0 as per OIML R 99			
Measurement ranges			
	Measurement range	Indication range	Resolution
CO	0 ... 10.0 % vol.	-2.00 ... 20.0 % vol.	0.001
CO ₂	0 ... 20.0 % vol.	-2.00 ... 21.0 % vol.	0.01
HC (n-hexanes)	0 ... 10,000 ppm vol.	-20.0 ... 15,000 ppm vol.	1
O ₂	0 ... 22.0 % vol.	-2.00 ... 25.0 % vol.	0.01
Lambda	0 ... 5.000	0 ... 5.000	0.001
PEF	0.470 ... 0.585 continuously calculated		
RPM (optional)	400 ... 10,000 min ⁻¹	0 ... 10,000 min ⁻¹	1
Oil temperature (optional)	0 ... 125 °C	-10 ... 200 °C	0.1
Ambient conditions			
Ambient temperature	5 ... 40 °C		
Ambient pressure	700 ... 1100 mbar		
Rel. air humidity	5 ... 90 %, non-condensing		
Interfaces			
Power supply	12 V DC via external power pack (230V)		
Bluetooth	Class 1, This device complies with Part 15 of the FCC Rules		
USB	V2.0 compliant		
Device data			
Power input	20 W		
Storage temperature	0 ... 70°C		
Dimensions	Width: 255 mm		
	Height: 200 mm		
	Depth: 305 mm		
Weight	approx. 4.5 kg		
Housing	Powder-coated aluminium		
Display	4 x 40 characters		
Keypad	Embossed membrane, 10 keys with pressure point		
Maintenance	Every 6 months		

9.1 Spare parts and accessories

Parts and accessories can be found on our website at wow-portal.com Partsmanager.

You can directly, easily and uncomplicated order the needed items by phone at your service partner

To the Partsmanager

10 Fault messages

No.	Fault	Explanation
U10	Measurement channel overrun in #1	Too many measurement channels configured
U12	Input fault	Value outside setpoint range: 1st value is greater than 2nd value
U13	Input fault	Value outside setpoint range: 1st value too small
U14	Input fault	Value outside setpoint range: 1st value too big
U15	Input fault	Value outside setpoint range: 2nd value too small
U16	Input fault	Value outside setpoint range: 2nd value too big.
U22	Not enough memory available. #1	System fault – internal memory overflow
U26	Protocol could not be sent #1.	Protocol could not be sent to the module displayed, for example a test bench or diesel measuring head
U27	No communication possible #1.	No communication with the module shown, for example test bench or diesel measuring head (for example data line to the measuring head/test bench interrupted).
U28	Fault during transfer #1.	Data transfer to the module shown, for example test bench or diesel measuring head, interrupted (for example diesel measuring head is not connected)
U35	The voltage of the O ₂ sensor is too low! The O ₂ sensor should be replaced.	If this does not happen, measurements may no longer be possible.
U36	Fault during calibration process. Calibration was terminated unexpectedly.	
U38	Zero gas was not correctly carried out before calibration. To be able to perform a gas calibration, a zero gas calibration must first be carried out.	
U39	Leak test was not correctly carried out before calibration. To be able to perform a gas calibration, a leak test must first be carried out and passed.	
U40	HC remnants present! Petrol fumes in the chamber? Filter soaked with HC?	Remedy: Make sure test room (garage/workshop) is well ventilated. If this message appears three consecutive times despite a well-ventilated room, switch off the device, clean the exhaust gas pipe, prefilter and filter housing, replace the fine filter insert and clean the filter housing. Switch the device back on again (restart). Observe operating instructions!

U109	Zero gas was not activated.	
U110	Zero gas has taken too long.	
U111	Calibration was not activated.	
U112	Calibration has taken too long.	
U113	Unexpected data length in response protocol to #1 from diesel measuring head	Communication fault between WDA2 and WGA2
U114	Command has not been accepted.	
U115	Smoke offset too big.	Light from other sources, incorrect halogen bulb
U116	Smoke factor too small.	Halogen bulb dirty, halogen bulb defective
U117	Offset temperature too large.	
U118	Temperature factor too large.	
U119	Pressure during offset calibration too big.	
U120	Pressure during factor calibration too big.	
U121	Fault during calibration of diesel measuring head.	
U122	Zero gas conditions not satisfied, HC too high or not stable	
U137	Test bench fault: System fault.	
U138	Test bench fault: Invalid data transfer	Possible causes: Calibration gas values are possibly outside the valid range: CO ₂ 1.00 – 20.00 % CO 0.500 – 15.000 % Propane 100 – 60000 % PEF value invalid. Zero gas not carried out correctly
U139	Test bench fault: Action currently not allowed. Poss. startup mode of test bench.	
U140	Test bench fault: Problems in gas line system.	
U141	Test bench fault: Invalid data length for command: #1.	Communication fault between WDA2 and WGA2
U142	Test bench fault: Delete flash.	
U143	Test bench fault: Write flash.	
U144	Test bench fault: Download flash.	
U145	Test bench fault: Action currently not allowed. Boot programme mode.	
U146	Test bench fault: More than 1 zero gas since startup	

U147	Test bench fault: Invalid command: #1.	Command shown cannot currently be carried out by the test bench (NAK = negative acknowledge)
U148	Test bench fault: System fault.	
U149	Test bench fault: O2 data invalid	
U150	Test bench fault: HC data invalid	
U151	Test bench fault: HC final value invalid	
U152	Test bench fault: HC zero value invalid	
U153	Test bench fault: CO data invalid	
U154	Test bench fault: CO final value invalid	
U155	Test bench fault: CO zero value invalid	
U156	Test bench fault: CO2 data invalid	
U157	Test bench fault: CO2 final value invalid	
U158	Test bench fault: CO2 zero value invalid	
U159	Test bench fault: NOX data invalid	
U160	Test bench fault: NOX zero value invalid	
U161	Test bench fault: Leak test	Gas line system leaking! Remove seal
U162	Test bench fault: Vacuum in system is too high.	Exhaust probe, exhaust pipe, filter clogged
U163	Test bench fault: Ambient temperature outside threshold.	
U164	Test bench fault: Pressure in the test bench is too high	Gas outlet clogged
U165	Test bench fault: No IR signal	
U166	Test bench fault: New O2 sensor required	
U167	Test bench fault: New NOX sensor required.	
U168	Test bench fault: Vacuum in system is too high	Exhaust probe, exhaust pipe, filter clogged
U169	Leak test: Pressure before pressure build-up is too low.	
U170	Leak test: Pressure before pressure build-up is too high.	
U171	Leak test: Vacuum in the system is too high.	
U172	Leak test The necessary vacuum could not be built up.	Possible causes: -System was not sealed -System was sealed too early (with running pump) -Gas line system leaking -Pump defective



U173	Leak test: Excessive pressure drop, system leaking.	
U174	Adjustment of calibration pressure has taken too long. Calibration process cancelled.	

11 Legal Information

11.1 WEEE SYMBOL INFORMATION



Correct disposal of this product (electric waste)

(Applicable in the countries of the European Union and other European countries with a waste separation system)

The identification on the product or in the accompanying documentation specifies that the product must not be disposed of together with domestic waste at the end of its service life.

Please dispose of this product separately from other waste to prevent damage to the environment or human health through unregulated waste disposal. Recycle the device to promote the effective reuse of material resources.

Private users should contact the dealer from whom they bought the product, or the responsible authorities, to find out how the device can be recycled in an environmentally friendly manner.

11.2 Complaints, warranty

1. The purchaser is obligated to inspect the product immediately upon receipt. If a defect is identified, this must be reported to WOW! in writing within 10 days of receipt of the product. If a defect is identified at a later stage, this must be reported in writing within 10 days of the discovery thereof. If such a defect is reported after the time period has expired, the assertion of such a defect and the associated rights shall be excluded.
2. If a defect exists, WOW! reserves the right to render subsequent performance either by correcting the defect or by supplying a new defect-free product. In the event of the failure of subsequent performance, the purchaser shall be entitled to reduce the purchase price or withdraw from the contract.
3. The warranty shall cover a period of one year.
4. Supplementary provision for transfer of software or use thereof: The purchaser is advised that, in accordance with the present technical development status, errors in the software program cannot be ruled out entirely. The purchaser shall inspect the software immediately upon delivery and notify WOW! of apparent defects immediately in writing. WOW! furnishes warranty to the effect that the software conforms in terms of its operation essentially to the description in the documentation or to the stipulations in the acknowledgement of the order. Furthermore, WOW! warrants neither specific qualities of the software programs nor their suitability for customer purposes or customer requirements.

11.3 Declaration of Conformity



Würth Online World GmbH
D-74650 Künzelsau
Telefon (07940) 15 3250
Telefax (07940) 15 3299
www.wow-portal.com
info@wow-portal.com

EG Konformitätserklärung *EC Declaration of Conformity*



Name des Herstellers:

WOW! Würth Online World GmbH
Schliffenstraße Falkhof
D-74653 Künzelsau

Dokument-Nr. 2131
Document-No.

Wir erklären hiermit, dass das Produkt
We hereby declare that the product

Abgasanalysator (Ottomotoren)
Exhaust Gas Analyser (Otto engines)
EG-Baumusterprüfbescheinigung
EC-type examination certificate number
Benannte Stelle Nr.
Notified Body No.

WGA 3
DE-10-MI010-PTB004
0103

konform ist mit folgenden Richtlinien des Europäischen Parlaments und des Rates, soweit diese auf das Produkt Anwendung finden:
are concurring with the following guidelines of the European Parliament and the Council as far as these are applied on the product:

Meßgeräte-Richtlinie (2004/22/EG)
Niederspannungs-Richtlinie (2006/95/EG)
EMV-Richtlinie (2004/108/EG)

Measuring Instruments Directive (2004/22/EC)
Low Voltage Directive (2006/95/EC)
EMC Directive (2004/108/EC)

Das Produkt entspricht ferner den folgenden angewendeten harmonisierten Normen bzw. normativen Dokumenten, Regeln und Technischen Richtlinien (Stand wie angegeben):
Furthermore the product complies with the following used harmonised standards and normative documents respectively, rules and technical guidelines (level as indicated):

OIML R99 ED 2008 / ISO PAS 3930 (2008)
WELMEC 7.2 Issue 1 (5/2005)
EN 61326-1 (2006)

Künzelsau, den 02.05. 2011

WOW! Würth Online World GmbH
Schliffenstraße Falkhof
D-74653 Künzelsau



Frank Schäfer
Leitung Produktmanagement
Head of product management



International Offices

GERMANY

WOW! Würth Online World GmbH
Schliffenstrasse Falkhof
74653 Künzelsau
☎ +49 (0) 7940/15-1770
☎ +49 (0)7940/15-3299
Automotive engineering hotline:
☎ 0180 / 5005078
E-mail: info@wow-portal.com
<http://www.wow-portal.com>

AUSTRIA

Würth Handelsgesellschaft m.b.H.
Würth Strasse 1
3071 Böheimkirchen
AUSTRIA
☎ +43 5 08242 0
☎ +43 5 08242 5 33 33
E-mail: info@wuerth.at
<http://www.wuerth.at>

BELGIUM

Würth België N.V.
Everdongenlaan 29
2300 Turnhout
☎ +32 14 445 566
☎ +32 14 445 567
E-mail: info@wurth.be
<http://www.wurth.be>

BOSNIA-HERZEGOVINA

WURTH BH d.o.o.
Binjezevo bb
71240 Hadzici, BiH
☎ +387 33 775 000
☎ +387 33 775 019
E-mail: info@wurth.ba
<http://www.wurth.ba>

BULGARIA

Würth Bulgarian EOOD
Mladost 4
Business Park Sofia 1
1715 Sofia
☎ +359 2 965 99 55
☎ +359 2 965 99 66
E-mail: office@wuerth.bg
<http://www.wuerth.bg>

CROATIA

Würth-Hrvatska d.o.o.
Franje Lucica 23/III
10000 Zagreb
CROATIA
☎ +385 1 349 87 84
☎ +385 1 349 87 83
E-mail:
wurth.hrvatska@wuerth.com.hr
<http://www.wuerth.com.hr>

CYPRUS

Würth Cyprus Ltd.
4, Vitona Str.
2033 Strovolos Industrial Estate
2083 Lefkosia
☎ +357 22 512 086
☎ +357 22 512 091
E-mail:
wuerthcy@cytanet.com.cy

CZECH REPUBLIC

Würth, spol. s r.o.
Prumyslová zóna
Neprevázka 137
29301 Mladá Boleslav
☎ +420 326 345 111
☎ +420 326 345 119
E-mail: info@wuerth.cz
<http://www.wuerth.cz>

DENMARK

Würth Danmark A/S
Montagevej 6
DK-6000 Kolding
☎ +45 79 323 232
☎ +45 79 323 242
E-mail: mail@wuerth.dk
<http://www.wuerth.dk>

FRANCE

Würth France SA
Z.I. Ouest
Rue Georges Besse - BP 13
67158 Erstein Cedex
☎ +33 3 88 645 300
☎ +33 3 88 64 60 94
<http://www.wurth.fr>

Assistance technique WOW!

☎ +33 3 88 64 54 42
du lundi au vendredi
de 8h00 à 12h00 et
de 13h30 à 17h00
UNITED KINGDOM
Würth U.K. Ltd.
1 Centurion Way
Erith
Kent DA 18 4 AE
☎ +44 208 319 60 00
☎ +44 208 319 64 00
E-mail: info@wurth.co.uk
<http://www.wurth.co.uk>

GREECE

Würth Hellas S.A.
23rd Klm. National Road
Athens-Lamia
145 68 Krioneri
☎ +30 210 6 290 800
☎ +30 210 8 161 691
E-mail: info@wurth.gr
<http://www.wurth.gr>

HUNGARY

Würth Szereléstechnika KFT
Gyár utca 2
2040 Budaörs
☎ +36 23 418 130
☎ +36 23 421 777
E-mail: wuerth@wuerth.hu
<http://www.wuerth.hu>

IRELAND

Würth Ireland Ltd.
Monaclinoe Industrial Estate
Ballysimon Road
Limerick
☎ +353 61 430 200
☎ +353 61 412 428
E-mail: cs@wuerth.ie
<http://www.wuerth.ie>

ISRAEL

Würth Israel Ltd.
Hatochen 2
Zone 34
Caesarea Industrial Park
P.O. Box 3585
☎ +972 4 632 88 00
☎ +972 4 627 09 99
E-mail: wurth@wurth.co.il
<http://www.wurth.co.il>

ITALY

Würth S.r.l.
Bahnhofstrasse 51
39044 Neumarkt (BZ)
☎ +39 0471 828 111
☎ +39 0471 828 600
E-mail: vendite@wuerth.it
<http://www.wuerth.it>
Assistenza WOW!
☎ +39 0471 827 789
MACEDONIA
Würth - Macedonia d.o.o.e.l.
ul. Prvomajska b.b.
1000 Skopje
☎ +389 2 272 80 80
☎ +389 2 272 88 72
E-mail: contact@wurth.com.mk
<http://www.wurth.com.mk>

NETHERLANDS

Würth Nederland B.V.
Het Sterrenbeeld 35
5215 MK 's-Hertogenbosch
Postbus 344
5201 AH 's-Hertogenbosch
☎ +31 73 6 291 911
☎ +31 73 6 291 922
E-mail: info@wurth.nl
<http://www.wurth.nl>

NORWAY

Würth Norge AS
Morteveien 12,
Gjellerasen Naeringspark
1481 Hagan
☎ +47 464 01 500
☎ +47 464 01 501
E-mail: kontakt@wuerth.no
<http://www.wuerth.no>

POLAND

Würth Polska Sp. z o.o.
u. Plochocinska 33
03-044 Warszawa
☎ +48 22 5 102 000
☎ +48 22 5 102 001
E-mail: biuro@wurth.pl
<http://www.wurth.pl>

PORTUGAL

Würth Técnica de Montagem Lda.
Estrada Nacional, 249-4
Abrunheira
2710-089 Sintra
☎ +351 219 157 200
☎ +351 219 151 331
E-mail: info@wurth.pt
<http://www.wurth.pt>

SERBIA

Würth d.o.o.
Pancevacki put 38
11210 Krnjaca - Beograd
☎ +381 11 2 078 200
☎ +381 11 2 078 225
E-mail: office@wurth.co.yu
<http://www.wurth.co.yu>

SLOVAKIA

Würth s.r.o.
Pribylinská ul. c. 2
83255 Bratislava 3
☎ +421 2 49 201 211
☎ +421 2 49 201 299
E-mail: wurth@wurth.sk
<http://www.wurth.sk>

SWITZERLAND

Würth AG
Dornwydenweg 11
4144 Arlesheim
☎ +41 61 705 91 11
☎ +41 61 705 94 94
E-mail: info@wuerth-ag.ch
<http://www.wuerth-ag.ch>

SOUTH AFRICA

Würth South Africa (Pty.) Ltd.
P.O. Box 616
Isando 1600
Johannesburg
☎ +27 11 281 1000
☎ +27 11 974 6169
E-mail: wurthsa@wurth.co.za
<http://www.wurth.co.za>

TURKEY

Würth Sanayi Ürünleri Tic. Ltd. Sti.
Eski Silivri Caddesi No. 46
34535 Mimarşinan
Büyükcemece
☎ +90 212 866 6200
☎ +90 212 866 84 85
E-mail: info@wurth.com.tr
<http://www.wurth.com.tr>