Portable PID (PPID)

User Manual

based on Firmware Revision: 1.00.013

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EG-Konformitätserklärung / EU-Declaration of Conformity

Hersteller / Manufacturer:

Analytical Control Instruments GmbH
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Die Analytical Control Instruments GmbH bescheinigt die Konformität für das Produkt /
The Analytical Control Instruments GmbH declares conformity of the product:

Bezeichnung / Product name:	Typ / Type:	Artikelnummer / Part No.
Personal Air Monitor PID	**PPID-G0**	**0002543**

mit den folgenden Bestimmungen / with applicable regulations:

EMV-Richtlinie / EMC-Directives:	2014/30/EU
RoHS-Richtlinie / RoHS-Directives:	2011/65/EU

Angewendete harmonisierte Normen / Harmonized standards applied:

EMV allgemein / EMC general:	EN 61326-1:2013	
Störaussendung / EMI Radiation:	Klasse / Class	B
Störfestigkeit / Immunity	Tabelle / Table	2

Analytical Control Instruments GmbH
Dipl.-Ing. (FH) Mirko Gerlach
Hardware and Approvals

Berlin, April 2016

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1 General

The company Analytical Control Instruments (hereinafter the 'manufacturer') provides with the Portable PID type PPID (hereinafter the 'device') a portable measuring detector for volatile organic compounds (VOCs) with a high stable hollow cathode lamp with Ceramic Discharge Channel with an ionization potential < 10.6 eV. The use of new technologies for the excitation source and the sensor allows a high stability of measurement and longer maintenance intervals.

2 Safety and Usage Instructions

2.1 Terms and Symbols

In this manual, certain common terms and symbols used to warn you of dangers or to give you cautions that are important in avoiding injury or damage. Observe and follow these cautions and regulations to avoid accidents and damage. These terms and symbols explained below.

DANGER

Indicates a hazardous situation, which, if not avoided, WILL result in death or serious injury.

WARNING

Indicates a hazardous situation, which, if not avoided, COULD result in death of serious injury.

CAUTION

Indicates a hazardous situation, which, if not avoided, MAY in minor or moderate injury.

NOTICE

Indicates a property damage message.

Usage

Indicates a helpful information, hints or recommendation.

2.2 Correct Use

The device is an electronically controlled photoionization detector for measuring concentrations of hazardous substances (gases, vapours) in the air (working environment, interior, and soil gas environment) and technical gases typically in the concentration range of 0.01 ... 2,000 ppm isobutene, under certain conditions, up to max. 20,000 ppm. The device is designed especially for field operations.

The device consists of impact resistant plastic. It has a compact, ergonomic requirements of justice to structure (small size, light weight, functional layout of the controls, legible display). The handling of the device is simple in design and can easily be accomplished by means of this operation and maintenance manual.

A diaphragm pump samples the air to be measured into a measuring flow cell, which is irradiated with high-energy light. By the physical process of photoionization, a current flow is generated, which is processed by an electronic evaluating unit (microcomputer) in a measurement value. This is shown on a display as concentration in ppm (parts per million).

The device is equipped with further functions such as error detection, detection of disrupted air flow (pump monitoring), optical and acoustic alarm, state of charge detection and temperature / humidity correction are included.

Use the device exclusively for measuring and monitoring of pollutants, contaminants, toxic gases or other impurities in the ambient air.

Condensing moisture, excessive heat, strong mechanical stresses are to be avoided, as the suction of corrosive vapours of acids, bases or oil mists, aerosols, dusts and smoke may result in higher concentrations of >2,000 ppm.

The intended use requires reading, understanding and observance of these operating and maintenance instructions. The device can also be used by non-experts after a short briefing.

2.3 Liability Information

The manufacturer accepts no liability in cases where the product has been used inappropriately or not as intended. The selection and use of the product are the exclusive responsibility of the individual operator. Product liability claims, warranties also as guarantees made by manufacturer with respect to the product are voided, if it is not used, serviced or maintained in accordance with the instructions in this manual.

2.4 Safety and Precautions Measures to be adopted

WARNING

The device contains high voltage parts inside. Disconnect the power supply before maintenance and service.

Check operation before use

Before each use, check the function and calibration of the instrument. Otherwise there is a risk that incorrect values are displayed. Control is achieved with a suitable test gas.

Pay attention to environmental conditions

The device is designed for ambient temperatures between 0 °C and 50 °C and duration of storage temperatures between -20 °C and 45 °C. The device can be damaged during operation or storage outside of these temperatures or battery life may be shortened. Insert the device for no abrupt change in air temperature or humidity. It is normal when the device heated during use or when charging the battery.

WARNING

The device **is not** intended for use in explosive atmospheres.

Power Supply

In case of damage to the housing, do not plug the AC adapter into operation. The power supply may only be operated in enclosed and dry areas. To prevent fire hazard or an electric shock, the power supply from moisture and rain is to be protected and prevented. Cleaning and maintenance work only when the mains power is switched off. Do not open the power supply.

Ignoring the safety instructions can cause damage to the power supply or serious personal injury.

Charging

Power up the device only with the included USB cable and power supply. The use of damaged cables or chargers or charging in humid environments can cause an electric shock. Make sure that the power plug and power cord are properly connected to the power supply. Power supplies can be hot and prolonged contact may result in injury during normal use. Always place power supply in an area with sufficient air movement for cooling effect.

Only use approved chargers which are allowed by the manufacturer. Charging performance can`t be guaranteed if unproved chargers will be used.

Observe all electrostatic sensitive electronics

The unit contains parts that are sensitive to electrostatic discharge. Maintenance or repair work may only be performed by trained and qualified personnel. An electrostatic discharge by touching the unprotected assemblies should be avoided. When a fault or damage caused by electrostatic discharge destruction of components, the warranty is void!

2.5 Permanent Instrument Warranty

Warranty

Manufacturer warrants that this product is designed and manufactured to the latest internationally recognized standards by manufacturer under a quality management system that is certified to ISO 9001. As such the manufacturer warrants that this product will be free from defective parts and workmanship and will repair or (at its option) replace any instruments which are or may become defective under proper use within twenty four [24] months from date of commissioning by an approved manufacturer representative. This warranty does not cover wearing parts, i.e. parts inside the gas way like pump, sensor, lamp or the Li-Ion battery and other or damage caused by accident, abuse or abnormal operating conditions.

Defective goods must be returned to manufacturer premises accompanied by a detailed description of any issue. Where return of goods is not practicable manufacturer reserves the right to charge for any site attendance where any fault is not found with the equipment. Manufacturer shall not be liable for any loss or damage whatsoever or howsoever occasioned which may be a direct or indirect result of the use or operation of the Contract Goods by the Buyer or any Party.

This warranty covers instrument and parts sold to the buyer only by authorized distributors, dealers and representatives as appointed by manufacturer. The warranties set out in this clause are not pro rata, i.e. the initial warranty period is not extended by virtue of any works carried out there under.

In no event will manufacturer be liable for any incidental damages, consequential damages, special damages, punitive damages, statutory damages, indirect damages, loss of profits, loss of revenues, or loss of use, even if informed of the possibility of such damages. Manufacturer is liability for any claims arising out of or related to this product will in no case exceed the order value. To the extent permitted by applicable law, these limitations and exclusions will apply regardless of whether liability arises from breach of contract, warranty, tort (including but not limited to negligence), by operation of law, or otherwise.

3 Applications

3.1 Measuring Tasks

The device allows versatility for the measurement of hazardous substances in the air according to different measuring tasks according to EN 482, Technical Rule 402, Technical Rule 900, VDI 4300, Federal Pollution Control Act, among other things such as:

- workplace measurements (overview measurements, control measurements, worst-case measurements)
- soil gas investigations (contaminated soils)
- Measurement of pollution in water and other materials contaminated with dangerous substances that can be converted as gases / vapours in air
- Measurements for firefighting operations (hazardous material accidents, accidents, fires)
- emission and immission
- leak detection in plants, pipelines, vessels

3.2 User and Application

- Contaminated sites enlightenment and restoration
- Medical Services
- Supervisors
- Except Operational and internal measuring points
- Education and training institutions
- Building Biology
- Construction Chemicals
- Construction Industry
- Professional associations
- Chemical industry
- Printing industry
- Oil industry (production, refining, transportation, storage, gas stations)
- Paints, coatings and adhesives industry
- Fire departments
- Dangerous goods transports (road, water, air)
- Health
- Wood Processing Industry
- Engineering
- Civil Protection
- Plastics Manufacture and Processing
- Warehousing
- Ventilation Equipment
- Police, Federal, customs
- Pest Control
- City Works, Technical Relief
- Inter-company safety services
- Environmental protection et al.

3.3 Principle of Measurement

The device works on the basis of the molecular photoelectric effect. All volatile organic compounds unleashed electrons when they are struck by photons whose energy is higher than the minimum ionization energy of the molecule. By this ionization, the molecules are no longer neutral and move in the direction of the negative electrode of the applied electric field. Once they reach the negative electrode sensor, the gas ions capture an electron from the electrode and thus produce a current flow, which is measured by the device. The free electrons in turn move in the opposite direction and are captured by the bias electrode. By the movement of the ions and electrons of the electric circuit is closed and the measurement current begins to flow. Under the assumption of a constant photon and gas flow, the measured current flow is directly proportional to the gas concentration.

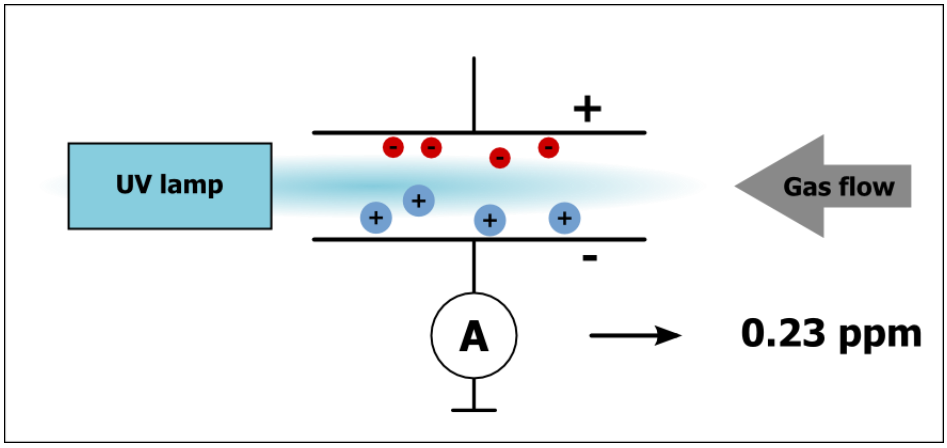

Figure 1 Working principle of photoionization

The hollow cathode lamp used in the device has an **ionization energy of 10.6 eV**. This energy is sufficient to ionize many chemical compounds (inorganic and organic materials). **Well ionisable** materials are, petroleum hydrocarbons, pentane, hexane, heptane, benzene, toluene, xylene, ethyl benzene, ethanol, propanol, butanol, aldehydes, ketones, organic acids, esters of carboxylic acids and many others.

But there are also substances for which this ionization energy is not sufficient to form charged particles to a degree that a measurable ionization occurs. These include, inter alia, for example, the natural constituents of the air, nitrogen, oxygen, carbon dioxide, water vapour, inert gases, as well as such materials as carbon monoxide, hydrogen, nitrous oxide, hydrogen cyanide, methane, ethane, propane, butane, sulphur dioxide, methanol.

4 Portable PID at a Glance

Figure 2 Front view of the device

Figure 3 Side view of the device

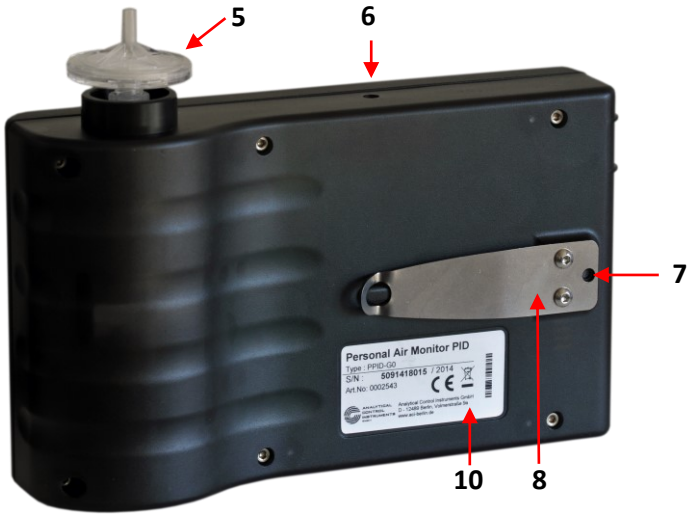

Figure 4 Rear view of the device

1 Display

2 Charging LED [yellow]

3 Function keys

4 Charging and communication jack

5 Filter [gas inlet]

6 Audible alarm

7 Reset button

8 Belt Clip

9 Alarm LEDs [red]

10 Label

4.1 Function Keys

The operation of the device is dialogue driven and controlled via the display by means of six function keys.

Function key	Description
	The **OK button** is used to **turn on the device** and to confirm the user-selected actions. By briefly pressing the **OK button** in the measurement mode, the current measured value is saved in the manual data memory.
	The **Up and Down button** is used to navigate through the menu view. By briefly pressing the buttons can be switched in measurement mode between the measurement views.
	The **Plus and Minus button** is used to increase or decrease the values in setup mode.
	The **Esc button** is used to enter the menu or to return to a higher menu view. The button is also used to acknowledge an active alarm. **Turn of the device** by pressing and holding the **Esc button** until device switches off.

4.2 Optical Signalling

LED	Description
RED	The red LEDs indicate alarm status of the device.
YELLOW	The yellow LED is a visual indication of the charging status. This LED is lit while the battery is charging and turns off when the battery is fully charged.

4.3 Acoustic Signalling

The alarm generates an acoustic signal operation.

4.4 Battery Charging

The device has a built-in rechargeable lithium-ion battery. Charging an empty battery takes with the included USB power supply less than 5 hours in the off state, in a normal environment with an ambient temperature of 23 °C.

If the device is powered on, charge time will be increased. In both power on and power off state, the device may be charged by the connection to PC via the USB.

Charging the battery
Connect the device using the supplied cable and USB power adapter into a power outlet.

Battery status indicator
The battery status icon is permanently displayed on the right top of the display. Each segment shows 25% of the usable battery capacity.

The rated operating time of the device at room temperature is 10 hours. The actual operating time varies depending on ambient temperature, alarm status and age of the unit.

5 Operation

5.1 Turn on

WARNING

Do not use the device without gas inlet filter. Impurities within ambient air can get into the gas path and destroy the sensor.

Press and hold the **OK button** for at least 1 second until the alarm LEDs light up. The device performs a self-diagnosis after turning on. The display remains black at the first few seconds. In this operation state, all internal components and sensor values are checked for validity. The red alarm LEDs light up in sequence and an acoustic signal sounds. The air pump is started.

5.2 Turn off

The device features two ways to turn off:

1. Select "Menu" > "Switch off" to turn device off.

or

2. Press and hold the **Esc button** until the device switches off.

5.3 Measurement Mode

After turning on the device enables the measurement mode in measurement view - standard.

Show in measurement view – Standard

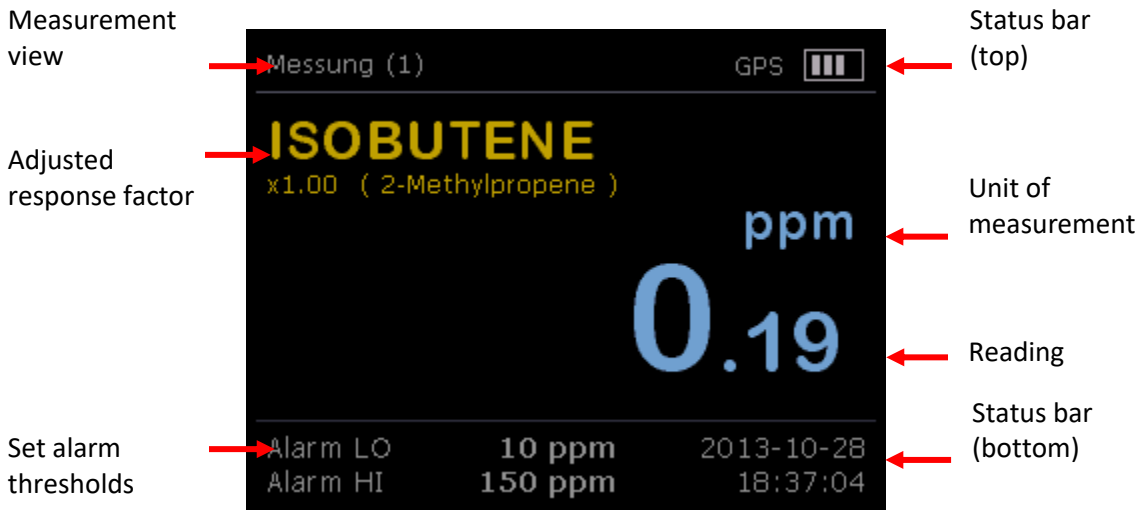

Figure 5 Measurement view (Standard)

By pressing the **Up and Down button** the user can choose different measurement views.

Displays the status bar (top)

Function	Display	Meaning
Measurement	Measurement (1)	Measurement View – Standard
	Measurement (2)	Measurement View – History
	Measurement (3)	Measurement View – Calibration
	Measurement (4)	Measurement View – Device Information
Location	GPS (grey)	GPS feature "turned off"
	GPS (yellow)	GPS function "turned on" but satellites were not found (tracking not possible)
	GPS (green)	GPS feature "turned on" satellites were found (tracking active)
Battery level	Bar chart (25, 50, 75, 100 %)	Each segment shows about 25 % of the battery level.

Display (center)

Function	Display	Meaning
Reading	#####.##	The measured PID-Sensor value is shown including the response factor applied to standard calibration. The measured PID-Sensor value is shown including the response factor applied to user gas calibration.
Unit of measurement	ppm	Unit of measurement
Adjusted response factor	gas name x ##.##	Displays the name of the activated gas (and thus the corresponding response factor).

Displays the status bar (bottom)

Function	Display	Meaning
Alarm threshold	Alarm LO Alarm HI	The alarm thresholds are set by factory and can be changed by device setting.
Date	JJJJ - MM - TT	Displays the current date setting.
Time of day	hh : mm : ss	Displays the current time setting.

Show in measurement view – History

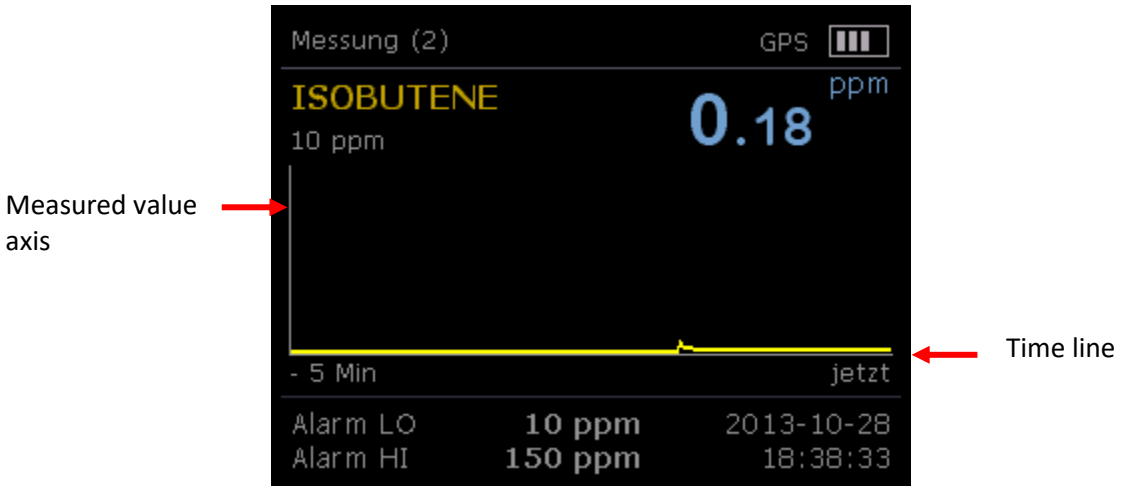

Figure 6 Measurement view (History)

Function	Display	Meaning
Timeline	5, 15, 30 min 1, 4, 8, 12 h	The timeline can be scaled by pressing the **plus or minus button**.
Measured value axis	10, 50, 100, 500, 1,000, 5,000, 10,000, 20,000 ppm	The measured value axis can be scaled by pressing the **plus or minus button**.

By pressing the **OK button**, the current measured value is stored in manual data storage. Stored data can be shown at "Menu"> "Storage" "View Manual data".

Show in measurement view - Calibration / Device Information

Figure 7 Measurement view (Calibration)

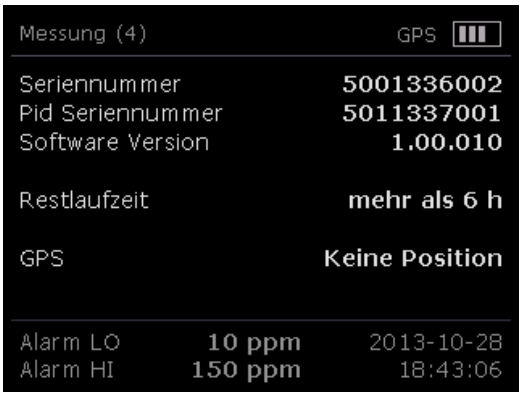

Figure 8 Measurement view (Device information)

Function	Display	Meaning
Standard calibration	last	Displays the date when the last **standard calibration** has been taken.
	next	Displays when the device must be calibrated again. The calibration interval is automatically calculated on the basis of the last calibration.
Users gas calibration	last	Displays the date when the last **user gas calibration** has been taken.
	next	Displays when the device must be calibrated again. The calibration interval is automatically calculated on the basis of the last calibration.
User calibration	Standard user gas	Displays which calibration is used for the measurement mode.
Acknowledgment	activated disabled	Displays if the alarm reset is turned on or off.
Serial number	##########	Displays the serial number of the device.
PID serial number	##########	Displays the serial number of the built-in PID module.
Remaining time [h]	Display in hours	Displays the remaining time until the battery needs to be charged again.
GPS	## ° ##‘ ##.##“ N [S] ### ° ##‘ ##.##“ E [W]	Displays GPS coordinates - latitude and longitude.

5.4 Fresh Air Setup (FAS)

A fresh air adjustment should be made in pure ambient atmosphere to increase the display accuracy **in principle before the start of a measurement.** The measured result on display is actually set to 0.00 by the fresh air calibration.

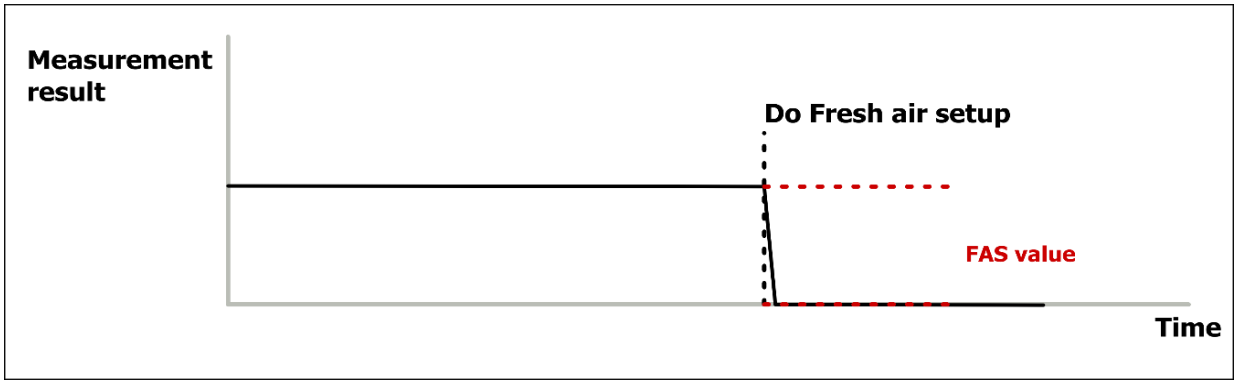

Figure 9 Fresh Air Setup

If the Fresh Air Setup fails (0.00 display will not be reached), then a calibration is carried out.
(see section 7)

Basically, we recommend the fresh air setup at high and low ambient temperatures on the local working field in order to increase the display accuracy. The Fresh Air Setup value is temporarily stored until the device is switched off.

FAS perform: Select "Menu"> "FAS" and then choose an option: Start Fresh Air Setup

The measurement and alarm function is switched off while the unit is in setting mode.

5.5 Device Setting

5.5.1 Date and time

- Select "Menu" > "Device" > "Date and Time" to set the date and time.

5.5.2 Language

- Select "Menu" > "Device" > "Language" to set the language.

6 Measurements with the Portable PID

Before each use, check the function and calibration of the instrument. Otherwise, there is a risk that incorrect values are displayed. Control is achieved with a suitable test gas.

6.1 Configuration - Measurement

The way of the measurement and the related display on the display depends on the selected calibration. The device supports two different calibrations:

1. Standard: refers to the **standard calibration** with isobutene in the air, including the use of response factors
2. User gas: refers to the **user gas calibration** with a calibration gas of your choice, without the requirement to know the response factors

6.1.1 Standard

The measurement setting Standard refers to the standard calibration with isobutene in the air. (see section 7.2)

Step 1:

- Select > "Menu" > "Measuring" > "Measuring config" > "Standard"

Step 2:

- Select from the list of possible response factors, a suitable response factor for your application.

Step 3:

- Select the alarm limits (**lower / upper** alarm threshold) according to your application.

Step 4:

- Select the alarm latching (**disable / enable**) according to your application.

6.1.2 User Gas

The measurement setting **User Gas** refers to the *user gas calibration* with a known calibration gas of choice. (see section 7.3)

Step 1:

- Select "Menu" > "Measuring" > "Measuring config" > "User gas"

Step 2:

- Select the alarm limits (**lower / upper** alarm threshold) according to your application.

Step 3:

- Select the alarm latching (**disable / enable**) according to your application.

6.2 Response Factor

The response factor is the sensitivity ratio between the signal of the measuring device, which is generated by the gas being measured, and the signal of the standard calibration gas with same concentration. For this instrument the standard calibration gas is based on isobutene (isobutene in the air). Generally, the response factor depends of the gas, the environmental conditions (temperature, humidity, air pressure) and the specific behaviour of the instrument.

The device is equipped with an integrated table of more than 250 response factors. This table based on average values of known response factors and allows a rough estimate of the measured value. For exact measurement the user should determine the correct response factor for the target gas, concentration and environmental conditions.

Additionally, the device supports up to 20 user-response factors. These can be created, edited and written to the device with the PC software "Portable PID Control Center".

The response factor currently in use is displayed in the Measurement view with the name of the sample gas.

Change the current response factor:

- Select > "Menu" > "Measuring" > "Measuring config" > "Standard"

The selection of possible response factors is available only in the measured setting **Standard**. (see section 6.1 **Configuration - Measurement**)

Make sure that the alarm thresholds corresponds to the new response factor after changing the response factor.

7 Calibration

WARNING

Test gases used for calibration can be a health risk. Proper ventilation or extraction has to be ensured.

WARNING

The calibration is carried out only by trained personnel. Improper calibration may lead to false results or measured values and thus to serious false statements to an existing hazard.

General

The Portable PID must be calibrated so that it can display the measured gas concentrations in ppm related to the calibration gas. The device will be calibrated with a two-point calibration.

First, the zero point calibration is determined by the supply of zero air without ionisable gases or vapours inside. Second, the sensitivity is determined by means of a calibration gas with known concentration of an ionisable gas or vapour.

Two different gases are required:

- Clean air (zero gas) without VOC constituents
- Calibration gas with a known concentration of isobutene (standard calibration) or a gas detectable by PID with an known concentration (user gas calibration)

Calibration data:
The device supports two calibration data for the standard calibration gas isobutene (standard calibration) and a custom calibration (user gas calibration). The calibration data can be created or changed independently of the chosen measurement setting.

Which calibration (standard calibration / user gas calibration) is carried out, depends on the measurement task (e.g. overview measurements, workplace monitoring, control measurements, worst-case measurements, environmental measurements, emission measurements).

It is recommended to calibrate with a concentration which is at the end of the last third of the expected signal range

7.1 Preparations before Calibration

To perform a calibration, you need a pressure cylinder of SPAN Gas, a flow reducer, a tube and a T-piece. The T-piece should be installed between flow reducer and gas inlet. The open tube length on T-piece junction should be 300 – 500 mm. The flow reducer should provide a flow of at least 500 ml/min. (see Figure 10 Calibration assembly)

Figure 10 Calibration assembly

For calibration, it is recommended to use the **Calibration Kit** from accessories. (see section 16 Spare Parts and Accessories)

7.2 Standard Calibration

Standard calibration is generally performed with the calibration gas isobutene, in the concentration range of 10 ppm to 2,000 ppm. This calibration is the base for the integrated response factor table.

Method:

- Select "Menu" > "Measuring" > "Calibration" > "Standard calibration" and follow the instructions on the display.

It is sufficient to use clean ambient air for "zero gas" calibration.
It is sufficient to use isobutene for "gas calibration".

Connect the pressure regulator and the bypass hose with the test gas cylinder. One end of the bypass tube must be inserted on the gas inlet of the device. Open the valve for about 30 seconds. After that time the current measured value (concentration of the applied calibration gas) should be displayed.

It must be pointed out that the device sucks the gas pressure-less. Use a T-piece and making sure that the flow rate of the gas cylinder (> 300 ml/min) must be greater than the inlet flow rate of the device.

Once the calibration is complete, the measurement setting should be checked for the measurement application. (see section 6.1). The device is now ready for use.

7.3 User Gas Calibration

For accurate measurements, we recommend to calibrate the device with a fluid (**user gas calibration**) which be measured later with the device.

Method:

- Select "Menu" > "Measuring" > "Calibration" > "User gas calibration" and follow the instructions on the display.

The following procedure is the same like Standard calibration (see section 7.2).

8 Alarm Settings

The device features two alarm thresholds:

- Alarm LO [low alarm threshold]
- Alarm HI [upper alarm threshold]

When reached or exceeded one of these alarm thresholds following occurs:

- an audible alarm will sound
- the optical alarm LEDs start flashing on and off
- the measured value on the display will change its colour representation
- the alarm icon (alarm LO or HI alarm) is displayed in the bottom status bar
- there is an entry in the alarm buffer

8.1 Alarm Thresholds

	Alarm value	**Activation**	**Signalization**
Alarm LO	Adjustable	Switched off	LED (red) will light alternately
	Min: 10.0 ppm		Alarm tone (slow)
	Max: 20,000 ppm		
Alarm HI	Adjustable	Switched off	LED (red) will light alternately
	Min: 10.0 ppm		Alarm (fast)
	Max: 20,000 ppm		

Change Alarm Thresholds:

Step 1:

- Select "Menu" > "Measuring" > "Alarms"

Step 2:

- Select the alarm thresholds (**upper / lower** alarm threshold) according to your application.

Step 3:

- Select the alarm latching (**disable / enable**) according to your application.

Enable **alarm latching does not automatically reset** when the gas concentration rises above the chosen alarm threshold (Alarm LO or Alarm HI). Press the **Esc button** to confirm the active alarm.

9 Data Logging

The device features a data memory for the recording of measurement data, alarm data, event data and manually recorded data.

9.1 Logging of Measurement Data

- Automatic storage of measurement data in an adjustable time interval
- Manual storage of measured data, by pressing the **OK button** during measurement

If the smallest adjustable measurement interval (5 s) is chosen, measurement data over a period of more than one working week could be stored.

Enabling and changing the automatic measurement data recording:

- Select "Menu" > "Data storage" > "Auto data logging "

The recorded measurement data can be read out **with a PC**. Use the PC software "Portable PID Control Center" to communicate with the device.

Size of the measured data set:

- Memory storage date and time
- Position indication (optional)
- Measured value
- Response Factor

View manual stored data:

- Select "Menu" > "Data storage" > "View manual data"

Delete manually stored data:

- Select "Menu" > "Data storage" > "Erase manual data"

9.2 Logging of Alarm Data

Automatic storage of alarm conditions:

- Alarm LO
- Alarm HI
- Exceeding the upper range (> 2,200 ppm isobutylene equivalent)
- falls below the lower range (<-10 ppm isobutylene equivalent)

View alarm data:

- Select "Menu" > "Data storage" > "View alarm data"

9.3 Recording of Event Data

The following events are recorded:

- Turn on / off
- Change / triggering and cancelling an alarm value or alarm
- Changing the current response factor
- When calibration is complete or error during calibration
- Delete the manual data memory
- Any errors that occur

View event data:

- Select "Menu" > "Data storage" > "View event data"

10 Reset to the Factory Settings

After executing this function you need to calibrate the device. All settings and data including user-specific response factors will be deleted.

Factory reset:

- Select "Menu" > "Instrument" > "Factory default"

Parameter	**Defaults**	
Alarm threshold	Alarm LO	Value to 100 ppm
	Alarm HI	Value to 500 ppm
Alarm latching	Latching	Disabled
Calibration	Standard	Standard calibration
Response Factor	Response	Isobutene
Auto Data Logging	Function	Activated
	Interval	1 minutes
Language	Language	English
Locating	GPS	Activated
Data storage	Measurement data	No content
	Alarm data	No content
	Event data	Settings are reset
	Manual data	No content

11 PC-Software

The PC program is used for evaluating and documenting measurement data obtained with the device.

A PC is required for:

- Diagnosis
- Data analysis
- Report Generation
- Online measurements

11.1 System Requirement

- PC running Windows 7, 8 or Windows 10 (32 - or 64-bit operating system)
- Spreadsheet program for data representation e.g. Microsoft Excel or compatible
- USB 2.0/3.0 port

11.2 PC-Software Installation

Step 1:

- Install the PC software "Portable PID Control Center" carried out from the included USB stick or download the latest PC software "Portable PID Control Center" from the Internet address www.aci-berlin.de.
- The *Portable PID* icon appears on desktop after installation.

Step 2:

- Connect the device to a free USB port on your PC via the included USB cable.
- If you **have an Internet connection**, Windows searches for a suitable driver and install it automatically. The installation process can take several minutes depending on your internet connection.
- If no Internet connection is available, install the driver manually, form the included USB stick in the folder *Driver*.

If the driver installation has finished reconnect the device to the PC.

11.3 Connecting the Portable PID

Step 1:

- Connect the device to a free USB port on your PC via the included USB cable.
- Start the software "Portable PID Control Center" from your desktop.

Step 2:

- Press the button "**Find instrument**"
- Select your favoured device and press the "**Connect**" button.

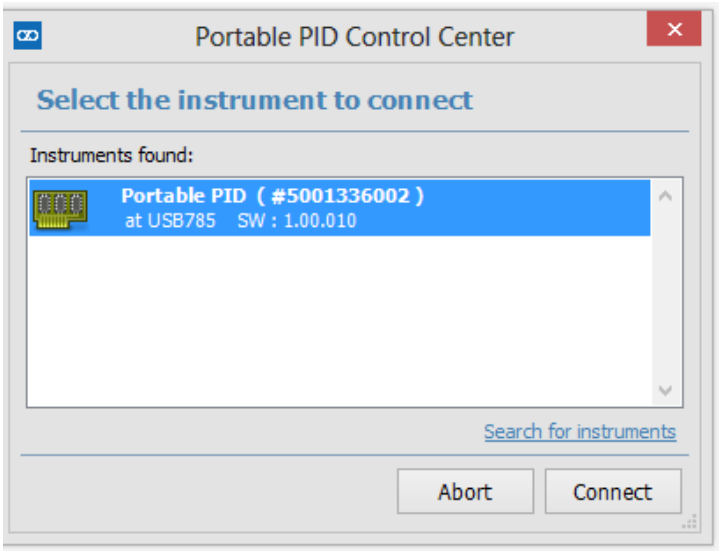

Figure 11 Device selection dialog

11.4 PC-Software Structure

Settings
Information about the device status will be shown (e.g. serial number, calibration, response factor etc.). You can save an Excel file as needed.

- Press the button "**Save report file as ...**" to save the measurement data via Excel file.

We recommend installing *Microsoft Excel Viewer* if no Microsoft Excel is installed. The Excel Viewer enables you to open, view, and print Excel worksheets without Excel installation. However, you can run other programs, such as *Open Office* to open, view and print.

Automatic Data Logging
The automatically stored measurement data could be read out. By default, the measuring data of the current day are read out. You can increase the period for past data gradually or read out the entire memory.

- Press the dialog "**Today**" to enlarge the time for past data.
- Press the dialog "**Read from instrument**" to read out the measurement data for the selected period.
- Press the dialog "**Save report file as ...**" to save the measurement data via Excel file.

The measurement data can be displayed in ascending or descending order. Do this, select the desired data column in the header..

If you have enabled the GPS positioning during your measuring, the position data (latitude and longitude) are assigned to the respective measured value. The GPS location is a very valuable additional function for measuring under the open sky. Measurement data can be analysed with position indication and alarm behaviour via **Google Maps** via web browser.

- Select the desired measurement data.
- Press the dialog "**Show selected item position in maps**" to represent the data via web browser.

Measurement values below the chosen alarm thresholds are displayed "**blue**" via Google Maps. Measurement values which have triggered an alarm condition are displayed "**red**" via Google Maps.

Manual Data Logging
Choose to read out manually data logging.

Alarm Logging
Choose to read out alarm loggings.

Event Logging
Choose to read out event loggings. (see section 9.3)

Online measurement
If the device is connected to the PC measuring data can be displayed permanently online.

- Press the dialog "**Start**" to start online measurement.
- Press the dialog "**Stop**" to stop online measurement.

Program settings
Choose basic program settings.

- Styles for data storage (Excel templates)
- Output folder for the data to be stored
- Viewing program such as Excel or Open Office
- Style template (.html) for Google Maps representation
- Output folder where measurement data are stored during online measurement

Press the dialog "**Apply default settings**" to restore default setting.

The data output is based on Excel templates which are stored on hard drive *C:\Program Files (x86)\Analytical Control Instruments\Portable PID. Templates are* stored on folder *Templates*. The user can edit and customize templates.

12 Maintenance and Service

WARNING

Do not open the housing of the Portable PID. There are electronics inside which generate voltages up to 500 V DC.

Proper function depends on the intended use and regular maintenance.

If the user does not exist recoverable errors, please contact the Service Department of the manufacturer.

Before each use, the following checks should be made:

- External condition of the device (visual check)
- Display control (display, lighting, damage)
- Check the gas inlet filter (visual check)

12.1 Maintenance Intervals

The maintenance intervals must be set keeping the environmental conditions in mind (especially in high-polluted environment). A periodic inspection of the device shall be performed at least once a year depending on real using time. It is strongly recommended that the maintenance intervals below be respected in order to guarantee reliable operation.

Part Number	Parts	Maintenance Interval	Comment
0002591	Dust Filter	1 times a year / or every 3 month	For use in high-polluted environment, the dust filter shall be exchanged every 3 month.

12.2 Cleaning

WARNING

The penetration of liquids is to be avoided to prevent damage to the electronics or the sensor.

The device can be wiped with a mild solvent-free detergent. Solvent could influence the measurement result.
Special care is required when cleaning the display window. Use only microfiber cloths to avoid scratching the plastic surface.

12.3 Replacement of Dust Filter

WARNING

Do not use the device without gas inlet filter. Impurities within ambient air can get into the gas path and destroy the sensor.

The gas inlet is equipped with a special gas inlet filter that protects the device from impurities in the gas path.

The gas inlet filter should be replaced if:

- Significant discoloration are present (visual check)
- Contamination is given (measuring signal even though no gas is present)
- Flow is disturbed (pump alarm)

Procedure:

1. Unscrew filter counter clockwise.
2. Screw new filter clockwise direction and tighten by hand.

12.4 Storage and Transport

Store the device in pollutant-free / low atmosphere to prevent interference during next measuring application. Use a shock-resistant packaging during transport or shipping.

13 Technical Data

Detector principle	VUV-Photoionization with 10.6 eV hollow cathode lamp with Ceramic Discharge Channel
Detection ranges	0 … 2 000 ppm Isobutene *
Display range	0 … 20 000 ppm, depending on response factor of detected substance
Lower detection limit	Typical 10 ppb *
Display resolution	Dynamic up to 0.01 ppm
Response time	T90 < 10 s *
Signal integrity	Up to 100 ppm typical > 98 % * Up to 2 000 ppm typical > 95 % *
Influence of humidity	Humidity and temperature compensation at 0 ... 50 °C and 0 … 90 % rH residual effect less than < 10 % FS
Operating conditions	0 … 50 °C 0 … 95 % rH, non-condensing
Storage conditions	-20 … 45 °C 0 … 95 % rH, non-condensing
Gas sampling	Integrated diaphragm pump (about 300 ml/min), with function monitor Sample inlet with dust and water protection filter
PID lamp life time	Min. 8 000 hours, typical more than 15 000 h
Localisation (optional)	GPS
Signalisation	Visual: Ultra-bright LEDs (red), Acoustic: Alarm, at least 90 dB (A) in 30 cm
Alarm	Locked alarm, Self-triggering alarm, adjustable alarm levels
Display	Full graphic color display, 3.5 inch TFT with 320 x 240 pixel
Program functions	Continuous measurement with automatic and manual data storage, threshold monitoring, two-point calibration, self-test, fresh air compensation, graphical illustration of the measured data
Memory	60 000 measurement data with time, temperature, humidity and position data (optional)
Power supply	Integrated lithium ion battery, Charging via USB connection at the PC or wall adapter
Runtime / Charging time	Up to 10 hours / < 5 hours with USB charger (100 … 250 V AC / 1 A)
Response factors	More than 250 selectable response factors can be set; input of user-specific response factors possible
Dimension, weight	176.5 mm x 102 mm 39.5 / 49 mm (L x W x H), weight: 550 g
Ingress Protection	IP54
Warranty	2 years, except for components in gas path and wearing parts
Approvals	EMC directive 2014/30/EU
Scope of delivery	Portable PID, USB-charger, USB-cable, USB stick with Windows Software, Carrying case, User Manual

* The indicated values were obtained under standardized conditions.
Test gas was isobutene in synthetic air.

14 Contact Information

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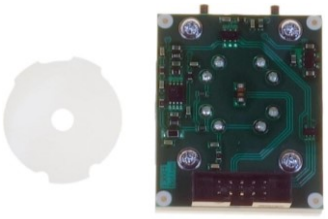
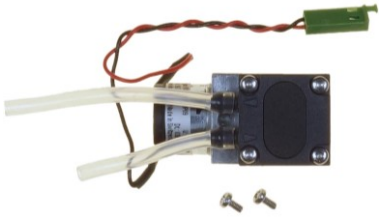
Website: www.aci-berlin.com

15 Ordering Information

Product name	Type	Part No.
Portable PID	PPID-G0	0002543
Portable PID (with GPS option)	PPID-G1	0002536

16 Spare Parts and Accessories

Part Number		
0002591	PPID / LAB PID – Gas Inlet Filter	
0002592	PPID – USB Dust Cover	
0002593	PPID – USB Cable	
0002594	PPID – USB Wall Charger	
0002595	PPID – Carrying Case	
0002701	PPID – Sensor Block Kit	

0002625	PPID – Pump	
0002719	PID – Calibration Kit	
0002735	PID – Calibration Gas 100 ppm Isobutene in air 34 l	
0002744	PID Calibration Kit Tube	
0002723	Flow Controller with pressure indicator 0-1000 psi / 68 bar 0.5 l/min	

17 Scope of Delivery

- Portable PID
- USB Wall Charger (DE version)
- USB Cable
- Carrying Case
- Windows Software (USB Stick))
- User Manual

18 Disposal and Recycling

This symbol (crossed-out wheeled bin) indicates that electrical and electronic equipment must be disposed of separately in EU countries. For private households, collection and recycling options are set. Since this unit is not registered for use in private households, it must not be disposed of by such routes. For the disposal of the unit can be sent back to the manufacturer. The product contains a lithium-ion battery.