# INSTRUCTION MANUAL

# 2240 PROcheck

## Fumigation Monitor




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**Revision history**

| | | |
|---|---|---|
| Revision 1.4 | September 2010 | Software amendments<br>concerning USB records-<br>Error handling extended |
| Revision 2.0 | March 2011 | GSM modem option added<br>Software amendments<br>Printer option removed<br>- option obsolete |
| Revision 2.1 | March 2022 | Updated address<br>4-20mA additional info<br>Obsolete details removed<br>UART-option removed<br>- option obsolete<br>Interface details added |
| Revision 2.2 | December 2023 | Updated normalization<br>Updated pictures |

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# 1. General Instructions

## 1.1 Indications

This manual has to be read carefully before switching on the instrument.
The instructions must be strictly adhered to.

**Non-observance of these instructions may lead to the loss of right to claim for damages or warranty!**

Meaning of signs used in this instruction manual:

 : Warning

 : Indication of particular importance

 : Avoid actions marked with this sign

***CATCHWORDS*** appear in italics on the right hand margin

## 1.2 Safety Precautions and Important Instructions

The **2240 PROcheck**-Analyzer is designed for monitoring, displaying, and logging the levels of a certain compound (gas).

The analyzer is not intended to be a safety monitor.
The **2240 PROcheck**-analyzer is not designed for use in potentially explosive environments. Never place and operate the instrument in areas with a potentially explosive atmosphere!

The analyzer should be used only for its intended field of application and should be operated only by qualified personnel.

## 1.3 Transportation / Storage / Unpacking

During transportation please make sure that the instrument is being protected against violent shocks or impacts. Transportation of instrument should as a matter of principle only be made in original cardboard box containing shock absorbing elements. When storing the instrument for a longer period of time, it should be wrapped in a plastic hood together with a silica gel bag for protection against humidity. During storage or transportation exposure of the instrument to temperatures below -10° or higher than +60° C must be avoided.

***TRANSPORTATION DAMAGES?***

Immediately after unpacking the instrument should be visually inspected for external damage which might have been caused to it during transportation. In the event of such damage, the supplier has to be informed immediately and the instrument must not be switched on by any means.

# 2. Description of Gas Monitor

## 2.1 Instrument layout

### 2.1.1 Front view

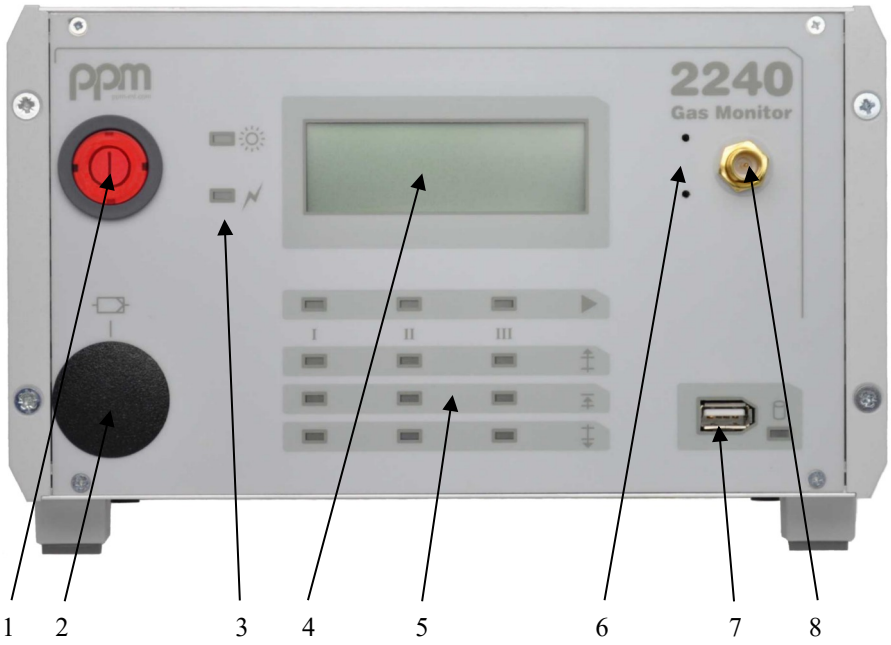



**Fig. 1 Front View**

1 mains switch
2 cover of activated carbon filter
3 device status display
4 LC-Display
5 measurement channel status display
6 push buttons (behind front panel) for instrument setup
7 interface USB-Stick (optional)
..8 GSM-Antenna connector (optional)

### 2.1.2 Rear View

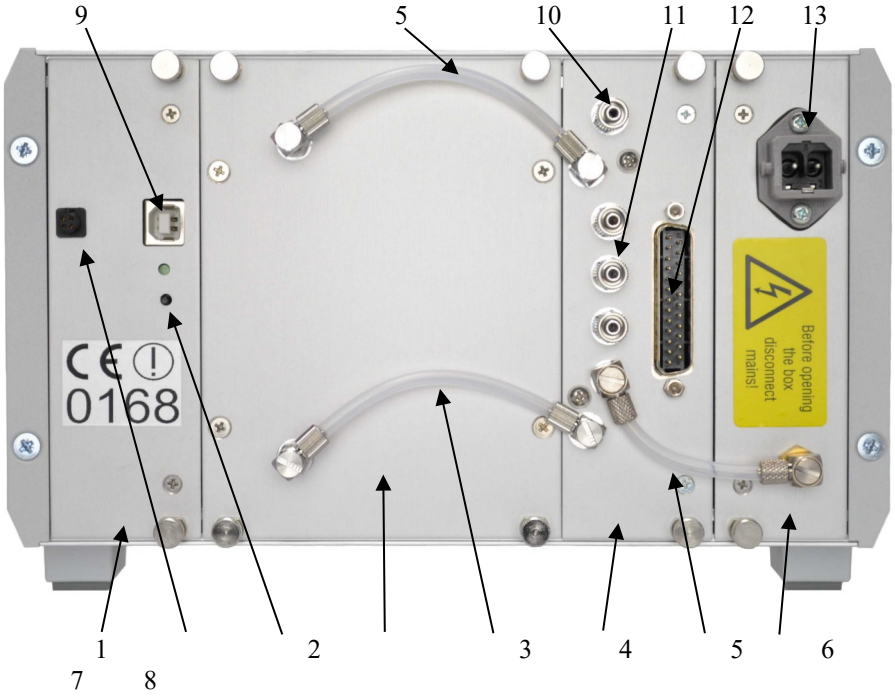



**Fig. 2 Rear View**

1 CPU-Module
2 Analog output (optional)
3 Reset-Button
4 Sensor-Module
5 Hose S/I – Sensor
6 Sampling / Interface module (S/I)
7 Hose S/I – activated carbon filter
8 Power supply module
9 Service interface connector
10 Gas outlet
11 Gas inlets (1...3)
12 SUB-D connector control interface
13 Mains power connector

## 2.2 Description of function

### 2.2.1 Description of sensor function

In Gas Monitors **2240 PROcheck** a sensor is being used which operates on the principle of

**Infrared - NDIR.**

By means of which the physical quality of many gases to react to electromagnetic waves (for instance infrared rays) is being exploited as they respond to a single (or to several) wave length(s) specific to every kind of gas as well as absorb such energy.

***PRINCIPLE***

An infrared radiation source emits IR-radiation of a wide range and of different wave lengths. An optical filter permits the passage of defined wave lengths of small band width from the radiation source's spectrum. This defined bandwidth is characteristic for the gas component to be determined.

At this wave length the gas component will absorb IR-radiation. This effect is converted into electric signals by a measuring transducer. The concentration of the gas component is being calculated via calibration functions filed in the Gas Monitor's configuration library.

### 2.2.2 Description of equipment function

The devices of the type 2240 PROcheck are primarily intended for measurement of gas concentrations in fumigation processes. They are equipped with 3 measuring gas connections, which can be selected either by the instrument software automatically or by an external controller (Plant- or machine-control). Two limits per channel can be adjusted to suit your requirements independently.

For measuring the gas concentration of the currently selected measurement channel, the gas to be analysed is drawn by the device internal diaphragm pump through a particulate filter and the sample gas line in the sensor (active sampling). During the measuring operation a large number of individual measured values is integrated. The result is continuously displayed and compared with the limiting values valid for the current measurement channel.

A comparison of the set limits versus measured value will be executed only after a predetermined time (set by device software) to avoid mispricing by short-term fluctuations in concentration. The formation of mean values for the storage (USB / GSM) begins just after this time has elapsed.

The “traffic light” indicator on the front panel visually inform about the status of the measuring channel with respect to the set limits.

For the behavior of the alarm contacts are three settings available:

- **NO** (normally open)
- **NC** (normally closed)
- **Alarm window**

The following tables describe the status of the LED lights and the signal contacts with different alarm settings.

Setting **NO**:
In this setting, the contacts of the pre- and main-alarm are **closed** in case of exceeded thresholds.

| **Measured concentration level** | **LED-Light** | **Contact** MOK(1..3)V | **Contact** MOK(1..3)H |
|---|---|---|---|
| Value < Pre-alarm and Value < Main-alarm |  | open | open |
| Value > Pre-alarm |  | close | open |
| Value > Main-alarm |  | close | close |

Setting **NC**:
In this setting, the contacts of the pre- and main-alarm are **opened** in case of exceeded thresholds.

| **Measured concentration level** | **LED-Light** | **Contact** MOK(1..3)V | **Contact** MOK(1..3)H |
|---|---|---|---|
| Value < Pre-alarm and Value < Main-alarm |  | close | close |
| Value > Pre-alarm |  | open | close |
| Value > Main-alarm |  | open | open |

Setting **Alarm window**:
This setting is useful when an area between pre-alarm and main alarm threshold must be met.

| **Measured concentration level** | **LED-Light** | **Contact** MOK(1..3)V | **Contact** MOK(1..3)H |
|---|---|---|---|
| Value > Pre-alarm and Value < Main-alarm |  | open | open |
| Value < Pre-alarm |  | closed | open |
| Value > Main-alarm |  | open | closed |

## 2.3 Manufacturer-based configuration

For best possible adaptation of instrument to the envisaged task many parameters of the configuration may be determined by the customer for their integration at the factory or by authorized service personnel, for example:

| | | |
|---|---|---|
| ⇒ | Alarm thresholds | (in ppm) |
| ⇒ | Operating mode | (externally controlled or automatic measuring operation) |
| ⇒ | Cyclic zero value measuring | (activated, not activated, time intervals) |
| ⇒ | Reference temp. and -pressure | Standard: no normalization |
| ⇒ | Time for measuring cycle | Standard: 20 seconds |

The changing of operating mode and/or of cycle time requires access to the internal settings of the instrument. For this purpose a special configuration software for authorized service personnel is available.

## 2.4 Adaptations at customer's facility

### 2.4.1 Adjustment of local time / date

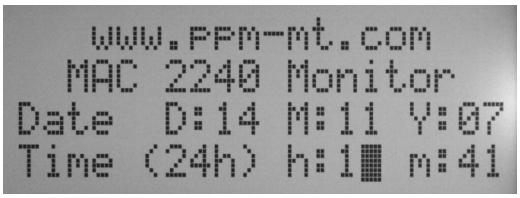
At the right-hand side of the display two switches are to be found behind two small bores in the front plate. These switches may be activated with a simple slim screwdriver or with a similar tool (Fig. 1, item 6) in order to set for instance exact local time and calendar date. The setting of time and date is achieved by following steps:

- Switch off instrument

- Keep upper switch in pressed down position and switch on instrument. The input mask will appear. Now release switch. The cursor is blinking at “day”.


- With the upper switch any full hour between "00 and 23 "may be selected and set
- Confirm the hour setting by briefly pressing the lower switch
- The cursor jumps to the next position (“month”). Proceed in the way described above.

After input of date is finished, the cursor jumps to the time input.




- Proceed similar to date adjustment
- After confirmation of the minutes field, the device continues with normal start-up procedure

**If there are any mistakes in the adjustment of date/time, please repeat from the beginning. In that case switch off device first.**

## 2.5 Technical data

| | | |
|---|---|---|
| Dimensions: | Height approx.:<br>Width (standard unit) approx.:<br>Depth approx.: | 150 mm = 5.91 in<br>235 mm = 9.25 in<br>270 mm = 10.63 in |
| Weight: | approx. 4.5 kg | |
| Electrical mains: | Wide range input<br>90 – 264 Volts AC<br>47 – 63 Hz | |
| Power consumption: | max. 65 Watt | |
| Temperature range: | storage:<br><br>operation: | -10°C to +60°C<br>(+14°F to +140°F)<br>+10°C to +40°C<br>(+50°F to +104°F) |
| Air moisture range: | 0 to 95%, non condensing relative humidity | |
| Digital display: | 4-line, 20-character-LCD-display, monochrome | |
| Measuring principle: | physical, infrared spectroscopy, NDIR sensor | |
| Compound: | SO2F2, Profume®, Vikane® | |
| Measuring range: | 1 – 150 g/m³ | |
| Accuracy: | 1% of measured value plus ± 0.5 g/m³ | |

# 3. Mounting and Installation

## 3.1 Mounting

*MOUNTING SITE*

**In order to assure trouble-free functioning of the instrument, mounting it as free of vibrations as possible is of essence. The instrument should be kept at a safety distance of at least 5 cm away from all surrounding walls to ensure free airflow for cooling of the equipment (see also chapter 3.2.2 for reference).**

The instrument has been specified for an ambient temperature range from +10°C (+50°F) up to +40°C (+104°F). Condensation of air moisture inside the instrument has to be avoided.

*FILTERS*

**For protection of valves and measuring chamber against pollution all measuring points have to be provided with appropriate filters. The filters should be installed closest to the sampling point to avoid contamination of the sampling hose.**

Suitable filters are of such quality that they will neither adsorb molecules of the gas components to be measured in the filter housing nor in the filter element itself. Moreover will they permit filtration of particles the size of 5 micrometers.

**Electric connection**
The electric mains for **2240 PROcheck** must meet the following requirements:

| | |
|---|---|
| Nominal voltage: | 90 - 264 Volts AC |
| Frequency: | 47 to 63 Hz |
| Power consumption: | max. 65 Watts |

**Before connecting instrument to electric mains verify if supply voltage meets those requirements and if it has been expertly fuse protected. Incorrect voltage may cause the fuse of the instrument to blow or damage the instrument itself.**

**WARNING! HIGH VOLTAGE!**

**Prior to opening up of instrument for any reason, its main power supply cable must be unplugged!**

**Non-observance of these instructions can result in personal injury or death.**



**Sample gas connections**
The sample gas inlet and outlet of **2240 PROcheck** are shown in **Chapter 2.1.2, fig. 2, items 10 and 11**.

The sample gas inlets can be equipped with gas tubes of length up to 100 meters without disturbance of the instruments function. On the sample gas outlet also tubes of length up to 100 meters can be connected.

Additional detailed information concerning sample gas hoses, installation of dust filter and about sampling of measuring gas is given in **Annex A**. Periodical changing of filters is described in **Chapter 7**, Maintenance.

**Installation of false filters and undue extension of maintenance intervals will inevitably lead to malfunctions or to damages on the measuring instrument!**

**In order to avoid clogging of valves or contamination of measuring chamber, the instrument should only be operated with appropriate filters installed right behind the measurement point!**

# 4. Start-up

Before connecting the instrument to the mains, make sure that supply voltage strictly corresponds to the requirements detailed in **Chapter 3.2.2**

**Before starting-up the instrument, remove dust seals from the measuring gas inlets and outlets. Also check the existence of the zero gas filter.**

Now you may start the instrument by activating the mains switch on the instrument front panel.

# 5. Operation

As soon as the instrument has been connected to the mains and switched-on, it will automatically run through the following routines before starting the actual measuring operation:

- **Self-Testing**
- **Warm-up period**
- **Auto-zero adjustment**

During the startup-process the green power-light is flashing.

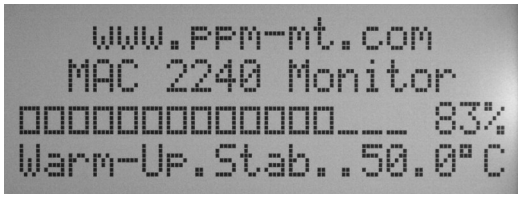
## 5.1 Self-testing of instrument

Immediately after the instrument is switched on, a self-test is performed. All optic and acoustic displays are powered for a brief moment. The compound to measure, its over-all measuring range and the software release is shown in the LC-display.

During the warm-up period and also while in normal operation (except while in Stand-By-Mode) the instrument will carry out automatic self-testing at intervals of approx. 20 seconds as a check on important instrument functions. In the event of any malfunction, the warm-up period or the actual measurement cycle will be interrupted with the most probable fault appearing on the display (see **Chapter 6,** - Malfunctions). Simultaneously an acoustic as well as an optical alarm (flashing of display and of fault indicator) will appear, which can be stopped either by pressing the alarm-quit-button (if realized at the connected machine/plant) or will stop automatically after 1 minute. In case of a malfunction of the instrument, a restart of the instrument becomes necessary.

## 5.2 Warm-up period


The measuring chamber of the sensor is being heated up until 50°C (122°F) have been reached. This will take approximately 3 minutes at an ambient temperature of 20°C (68°F). The actually prevailing temperature inside the measuring chamber will be displayed in °C. A progress bar shows the percentage of completion.




After 50°C (122°F) have been reached, warming up is being continued a certain time period ('stabilizing') in order to make sure that the whole unit has adopted the desired operating temperature.

As soon as the unit finished heating, zero adjustment starts.

## 5.3 Zero adjustment

Repetitive zero adjustment will compensate possible changes in the sensor equipment (e.g. aging of infrared source) and this way eliminate zero drift. Ambient air is being drawn in through the installed activated carbon filter (**fig. 1, item 2**) or as may be the case through an external zero gas inlet (see below) and measured in the sensor. Since in a properly serviced zero filter the activated carbon will adsorb the measurable substance(s), the concentration of substance(s) in the sensor equals zero.

**To provide error-free zero adjustment, the activated carbon filter must be changed regularly. Spent activated carbon filters will lead to incorrect test results or to error indication**

*INTERNAL MEASURING RANGES*

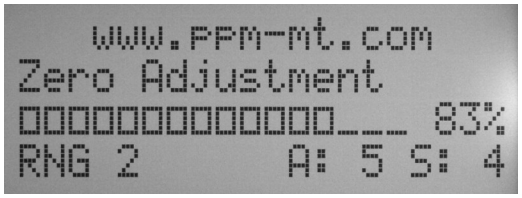
Only under the condition that at least **4 consecutive zero adjustment cycles** are within a specified tolerance, the zero value will be accepted. In case a measuring value exceeds the specified tolerance (caused e.g. by a contaminated measuring chamber or by leaks etc.) the number of previous measured values will be reset to zero. **2240 PROcheck** will then renew its effort for zero adjustment. If after 50 attempts no consecutive values prove to be correct, the instrument will stop zero adjustment and indicate a failure (see **Chapter 6**).

*DURATION OF ZERO ADJUSTMENT*

Duration of zero adjustment is approx. 2 minutes in a favorable case. In the most unfavorable case this operation may take up to 15 minutes if e.g. the gas path or the measuring chamber is contaminated. If no correct zero adjustment is being achieved within this time frame, then a failure indication will be given (see **Chapter 6**).

*DISPLAY*

During the zero adjustment the display will show the measuring range actually under test and additionally the progress of zero adjustment:




**RNG** indicates the actual measuring range, The value after the "**A"** shows the number of attempts and the value after the "**S"** shows the number of results lying within the specified tolerance bracket.

After successful zero adjustment the instrument normally switches to "Stand-By-Mode"

Depending on the configuration of the instrument this stand-by mode will either be maintained or it will automatically switch over to measuring at a pre-configured channel.

*AUTOMATIC ZERO ADJUSTMENT*

**2240 PROcheck** automatically carries out a zero adjustment procedure after every activation of the mains switch.

*MANUAL ZERO ADJUSTMENT*

In those cases where **2240 PROcheck** has been in operation over a period of several days **without interruption** a manual zero adjustment is recommended. The user may trigger such manual zero adjustment by pressing the push- button ”Reset” on the rear front plate of the CPU-Module (see fig. 2, item 3).

The instrument will then initiate the power-up-cycle described in this chapter. This sequence includes carrying out a zero adjustment.

*CYCLIC ZERO ADJUSTMENT*

In cases where the instruments are intended to serve in continuous operation, it is recommendable for the user to opt for activation of the program function "cyclic zero adjustment" at the manufacturer's side or by authorized service personnel, rather than selecting the repetitive manual triggered zero adjustment.

As an interval for cyclic zero adjustment any full hour within a time frame between 1 and 35 hours may be set up to the program. The interval to be set should reflect the intensity of operation as well as other local influencing factors e.g. change of shift etc.

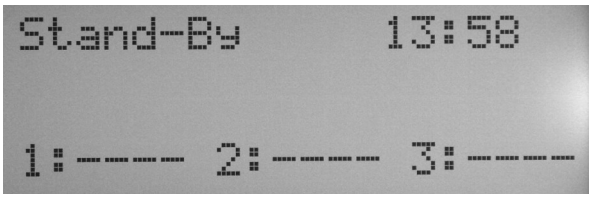
After every lapse of the programmed time interval **counting from the start-up moment**, the measuring operation will be interrupted to be followed by a zero point adjustment. Thereafter the measuring operation will be resumed.

## 5.4 Automatic measurement operation

When programmed for automatic measuring operation, **2240 PROcheck** will directly change over to measurement operation after successful zero adjustment (see **Chapter 5.6,** Measuring process).

## 5.5 Externally controlled measurement operation

When programmed for externally controlled measurement operation, the instrument will fall into the passive mode ”Stand-By” after successful zero adjustment.



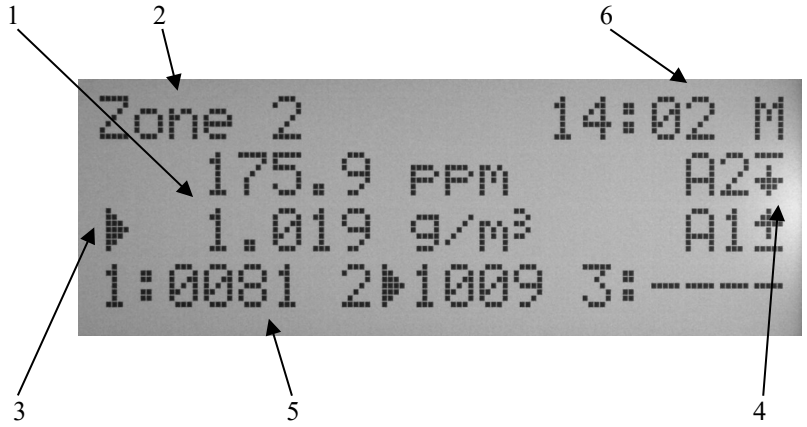

No measuring is made.

In this mode **2240 PROcheck** is expecting a request for measurement to be made. By means of the standard machine interface that request will be sent to the instrument by the external control using the signal MRQ(1..3), (for reference see **Annex A, fig. A1, A2**).

## 5.6 Measurement process

***DISPLAY***

The instrument display is informing the user continually about the actually measured gas concentration (referring to preset normalized parameters) and other conditions while in measuring process.




1. Measurement results are shown in g/m$^3$ (or mg/m³) (only in this example picture including ppm). If the symbol "<"precedes the measured value, the real measured value lies below the indicated value. On the other hand, if the symbol ">" should appear, the real value is above the over-all measurement range. Normally in this case also the limit value alarms are triggered (if set accordingly).
2. The text "Zone 1" refers to the selected measuring point (here: Measuring point 1). This description of the measuring point can hold up to 12 characters and can be set by authorized personnel.
3. The arrow symbol on the left side of the measured values indicates the unit, which is referred to for averaging / average value storage, alarm state and other procedures (here: mg/m$^3$).
4. The symbols on the right of 'A1' and 'A2' inform about the state of the measured value in relation to the adjusted alarm thresholds. Please consider that the limit value 'A1' is lower than the limit value 'A2'. 'A2' represents a main alarm state, where 'A1' is normally used as a pre-alarm warning threshold. The LED display on the front panel informs like a traffic light about the exceeding or falling short of the limit values. In our example the measured value is above the 'A1' threshold and below the main alarm threshold 'A2'.
5. The last line of the display provides a 'last value' display for each measuring point.
6. On the right side of the first display line the current time is displayed as well as a status information of the measuring process: 'M' for measuring, 'P' for purging, 'W' for waiting. If option 260 (GSM-Modem) is installed, periodically the network power is indicated.

***REFERENCE CONDITIONS***

The displayed measuring results for concentration are not normalized. Normalization to a reference temperature of 0°C (+32°F) and to an atmospheric pressure of 1013 mbar (14.69 psi) is possible by factory setting. Other reference temperatures and -pressures may be preset in the factory. The actual atmospheric pressure on site is being be measured in **2240 PROcheck** and used for calculation of the measured values.

***MEASURING CYCLE***

During every measurement the standard measuring program will run trough the following cycle:

1. The sensor is being flushed with actual measuring gas (**P**).
2. Then the instrument goes on hold for a short moment (**W**).
3. Now the measurement is carried out. The result of the measurement will be a mean value being formed from quite a number of single measurements (**M**).
4. The measurement result is being compared with the preset alarm threshold values and if it falls short of the alarm limits as well as remains within the time frame allowed for evaluation, a corresponding signal is transmitted via signal line MOK(1..3)H or MOK(1..3)V (closing respectively opening of a contact) through the standard machine-interface (see **Annex A, fig. A2**).

   The evaluation allowance, i.e. time span during which the result must steadily remain below the alarm threshold value until a MOK(1..3)-V or -H-signal will be released is 2 measuring cycles.

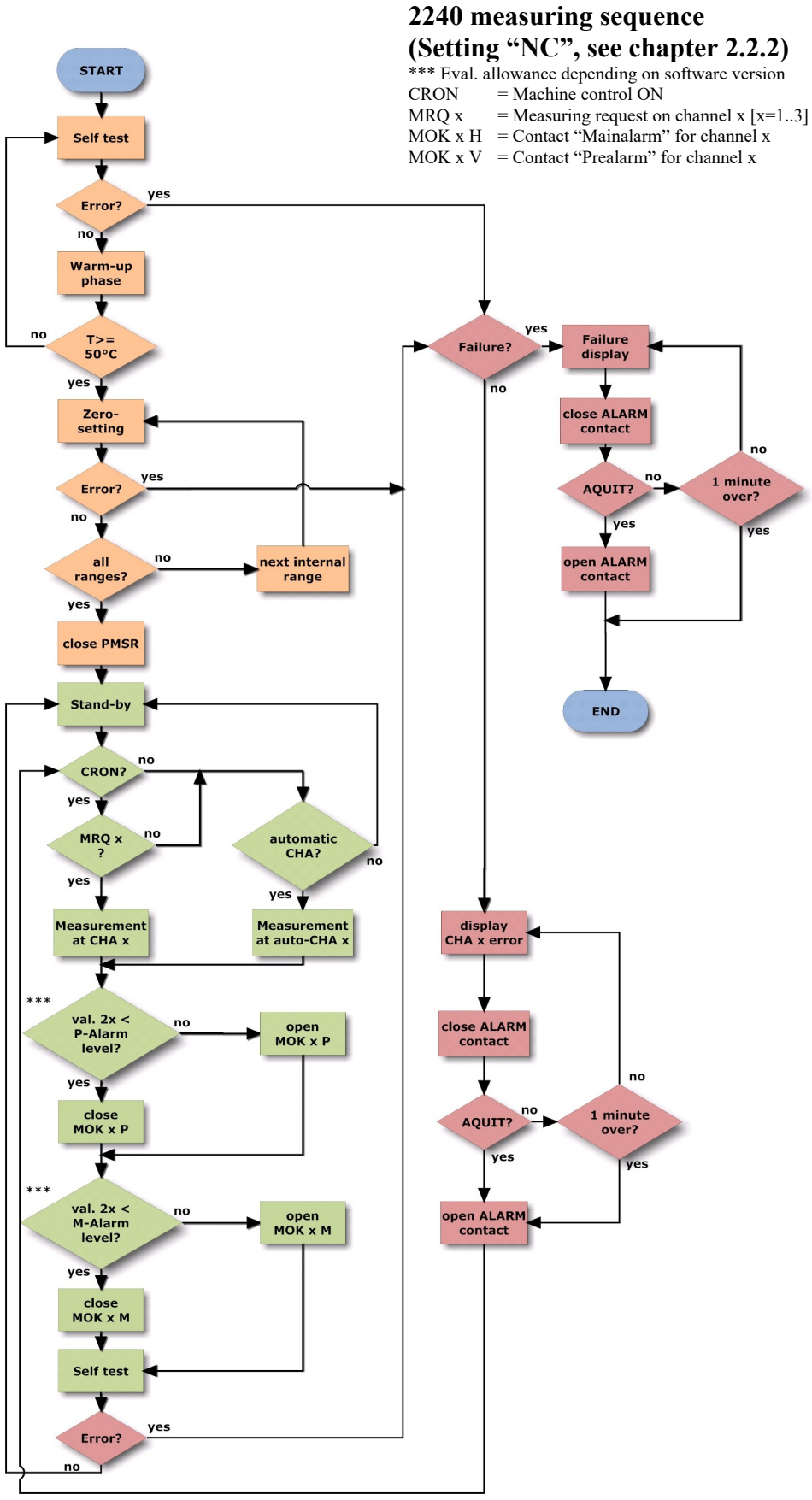



Fig. 6 Measurement Process

# 6. Operational Failures

## 6.1 Messages on instrument display

Messages about errors are shown on the LCD-Display.
Simultaneously the contact PMSR (instrument ready for measurement) on the machine-interface (see also **Annex A, fig. A2 and A5**) is opened and the contact ALARM will be closed. The alarm may be acknowledged via the input AQUIT (quit alarm, machine control) or it will come off after 1 minute automatically. In case of malfunctions of the instrument (e.g. IR-source defect), PMSR will not be closed again and operation of the instrument cannot be continued right away. In the event of other errors, continuation of operation is possible in normal cases (see below).

**There are two kinds of messages to be differentiated:**

***WARNINGS***

### 6.1.1 Warning messages

indicating a critical operational state of the instrument or warning about critical ambient conditions.

**Warning messages should cause the operator in charge to take corrective action towards termination of critical state.**

**If the critical condition is terminated, the warning will come off automatically.**

**"Modem offline" –** only with option V260 installed

Cause:
- Modem no network

Corrective action:
- Install instrument in range of network
- Check antenna and dedicated connector

**"USB-Stick missing" –** only with option V253 installed

Cause:
- Data storage device missing

After switching on the equipment and no storage medium is discovered, the warning is once spent. Afterwards the absence of the storage medium is ignored.

Corrective action:
- Install USB-Stick

### 6.1.2 Failure messages

Failure messages are indicating (with acoustic alarm and blinking failure-indicating lamp) that a direct return to normal operation of the instrument is not possible. The instrument must be switched off. After successful elimination of cause for failure or breakdown instrument may be switched on again for normal start-up procedure.

**WARNING! HIGH VOLTAGE!**

**Prior to opening up of instrument for any reason, its main power supply cable must be unplugged!**

**"Zero setting unstable"**
Explanation:
Sensor unable to conform preset value within determined tolerances during zero setting.

Probable causes:
- Contaminated air
- Zero-gas filter used up
- Measurement chamber leakage at inlet/outlet gate valve because of insufficient dust filtration or excessive suction (higher than 50 mbar = 0.7 psi)
- Excessive suction may also be caused by hose lengths exceeding permissible length.

Corrective action:
Place instrument in not contaminated air.
Replace zero-gas filter (activated-carbon filter on instrument front panel). If problem re-occurs, exchange of measuring cell is required (manufacturer).

**Incorrect installation of filter and undue extension of maintenance intervals will cause malfunctions or damages of measuring instrument.**

**"Operating temperature too low“**
Explanation:
Ambient temperature lower than 5°C resp. 41°F

Probable causes:
- Instrument or ambient temperature is to low (outside of the operating parameters).

Corrective action:
- At occurrence of this error message, operator in charge should at first check if external influences are causing this critical situation, and if applicable, eliminate those negative influences.
- In case error message was not caused by external influences, defect module(s) should be replaced (manufacturer).

**"Operating temperature too high“**
Explanation:
Ambient temperature higher than 40° C resp. 104°F

Probable causes:
- Instrument is directly exposed to external heat sources (inadequate ventilation, high solar radiation, problematic installation site).

Corrective action:
- At occurrence of this error message, operator in charge should at first check if external influences are causing this critical situation, and if applicable, eliminate those negative influences.
- In case error message was not caused by external influences, defect module(s) should be replaced (manufacturer).

**"Pneumatic system“–** only with option V252 installed
Explanation:
Pump does not supply measuring gas (no pump noise audible) or gas hose blocked

Probable causes:
- Pump defect
- Gas return-hose or -valve is blocked
- Gas sampling-hose or –valve is blocked

Corrective action:
- replace MG-IF-module (manufacturer)
- remove circulation blockage in gas system.

**"RTC“**
Servicing required. Send instrument for repair

**“AD-converter“**
Servicing required. Send instrument for repair

**"EEPROM"**
Servicing required. Send instrument for repair

**"CFG“**

Probable causes:
- Defect in data-/program - memory or manipulated data

Corrective action:
- Servicing required. Send instrument for repair

**“USB-Stick“–** only with option V253 installed

Cause:
- Error on USB-Stick, no writing possible.

Corrective action:
- Exchange data storage device

**"CFG-Mode active “**

Cause:
- Wrong operation of instrument
- Access to internal configuration

Corrective action:
- Switch off instrument and wait for 20 seconds. Than turn on the instrument again.

## 6.2 Communication problems between instrument and plant control

Further more some malfunctions are listed which may occur during communication between plant control and the instrument.

### 6.2.1 Errors caused by plant control

- **MRQ(1..3)-Signal not constant during request for measurement**
  If significant voltage breakdowns (longer than 50 ms) occur, unintentional switch-over to a non-selected channel may happen.

- **Involuntary switch-over of channel**
  If on request from plant control the instrument is measuring on a particular channel and if by mistake plant control requests simultaneously an additional channel for measuring, the instrument will automatically switch to the higher numbered channel.

- **No reaction of instrument**
  In case the signal „CRON“ has not been set by the machine control, instrument will not react to any requests for measurement.

- **Alarm-reaction of instrument on channel change-over**
  If, at a change-over of channels, the control lamp of the quit channel starts blinking alternating with the control lamp of the consecutively selected channel and if at the same time the alarm comes on, then this channel change-over has presumably been initiated at a moment when either gas concentration was in excess of limit or the evaluation time allowance was too short. In such case the plant control obviously performed an automatic switch-over without waiting for the MOK(1..3)H-signal from the instrument.

  The MOK(1..3)V-Signals are not observed for alarm condition during change-over.

### 6.2.2 Error on interface cable

- **No reaction of instrument**
  Broken wires on interface cable or on plug

### 6.2.3 Error on Gas Monitor - interface module (MG-IF)

- **No reaction of instrument on request for channel change**
  If the instrument does not change measuring channels, although the control signals MRQ(1..3) and CRON have correctly been issued at the plant control side, at first the interface cable has to be inspected for defects (broken wires or bad contacts). If no defect can be located there, the interface module has to be replaced (manufacturer).

- **No reaction of instrument even if results remain below limit**
  In case the instrument does not evaluate results respectively does not acknowledge signal, although at plant control side the control signals MRQ(1..3) and CRON are found to be OK, check first if the red- or the green light of the channel concerned is activated on the instrument front panel or not. If no such light is on, measuring time should be extended. If situation is not improved thereby, verify if result signal contacts are properly connected at plant side. In the affirmative, the interface cable should be inspected for possible wire damage. In case no defect is found on cable either, the interface module has to be replaced (manufacturer).

# 7. Maintenance

## 7.1 General hints

The instrument has been designed for optimum maintainability. A skilled user may perform all conditioning maintenance work himself if required.

*CLEANING*

The instrument housing may be cleaned with a smooth cloth which has been wetted with water and only a few drops of cleansing agent.

**Never use organic solvents (e.g. PERC, TRI, Acetone). Organic solvents may be harmful to instrument front panel and painted surfaces.**

## 7.2 Exchange of Activated Carbon filter

*ACTIVATED CARBON FILTER EXCHANGE*

In order to receive flawless zero adjustments, the activated carbon filter must be changed regularly. The exchange interval will strongly depend on:

- Dust content and concentration of components to be measured as well as content of chemical combinations in the ambient air which may be adsorbed by activated carbon. The higher the contents, the sooner an exchange of the filter element will become necessary.
- The frequency of zero adjustments (among others dependent on operating period of plant).

**We recommend to change the activated carbon filter every 3 months.**

**Wrong installation of activated carbon filter or postponement of due maintenance will lead to malfunctions of the instrument!**

For filter change proceed as follows:

- The activated carbon filter (zero filter) is located behind the circular cover plate on the front panel, Figure 1, Item 2.
- Lift up this circular cover plate by carefully levering it open with a small screw driver. Insert the screwdriver from above of the cover plate and carefully press down the retaining tabs.

- Insert the supplied filter-exchange tool into the opening. Turn it carefully counterclockwise until the filter becomes loose. Now unscrew filter from its socket by turning tool counterclockwise.

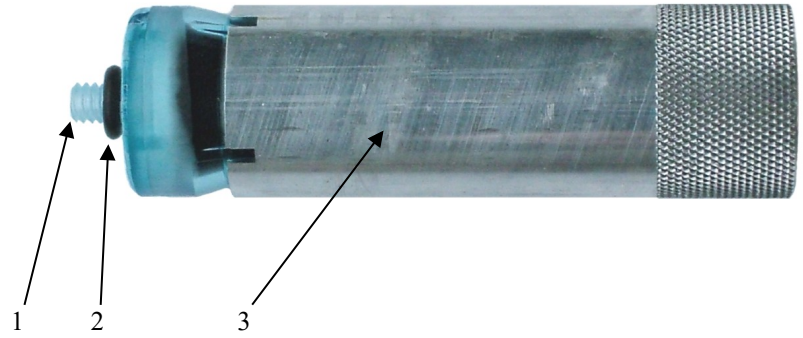



**Fig. 7**
1 thread
2 rubber gasket
3 filter exchange tool

- Insert new filter into filter-exchange tool. Make sure that the rubber gasket (fig. 7, item 2) of the filter cartridge is in place. Insert tool with filter into opening on instrument front panel.
- Screw in filter clockwise into its panel-mounted socket. Tighten filter **applying gentle effort only**.

**Never tighten filter too much - otherwise thread might break off!**

- Let circular cover (fig 1, item 2) snap back into front panel.
- Complete printed text on supplied sticker by filling in actual date into line reading

"last filter change on....."

and apply sticker right on top of the cover. This will facilitate your control of observance of filter change schedule.

**Always keep a sufficient quantity of the genuine Activated Carbon filters and of dust filters available on stock.**

**Used-up dust- and Activated Carbon filter-cartridges may be disposed of with normal waste.**

A list of spare parts can be found on **Annex A6.**

## 7.3 Exchange of sample gas filters (particle filter)

Appropriate sample gas filters are of such nature as they will neither adsorb molecules of the sample gas components in the filter element nor in the filter housing. Furthermore must they permit filtration of 5 micrometer particle size.

**In order to avoid contamination of valves, of sample gas tubing, and of the measuring cell, the instrument must exclusively be operated using genuine particle filters supplied by ppm-mt!**

When changing sample gas filters, proceed as follows:

- In order to avoid contamination of sample- gas tubing during changing of filters, switch off instrument or pull off suction hose at rear side of instrument.
- Unscrew the dust filter screw caps.
- Insert the new dust filter. A label attached to it is showing an arrow indicating the flow direction of sample gas.

**The arrow must point towards hose end leading to instrument (not towards end leading to plant)!**

- Write down actual calendar date on filter label. This will facilitate control of observance of filter-change schedule.

**We recommend to exchange particle filters every 3 months.**

A list of spare parts can be found on **Annex A6.**

## 7.4 Calibration of Instrument

**The instrument-integrated functions concerning avoidance of zero-drift are described in chapter 5.3 of this instruction manual.**

The possibility for re-calibration of the Gas Monitor **2240 PROcheck** is conventionally included in the scope of functions of every software version. For reference see separate calibration instructions for service personal.

The re-calibration job may be done by authorized service personnel only.

Naturally the re-calibration may also be performed by the manufacturer, with a manufacturer's calibration certificate.

**Inform yourself which type of re-calibration is being required by your competent local authority.**

# 8. Options

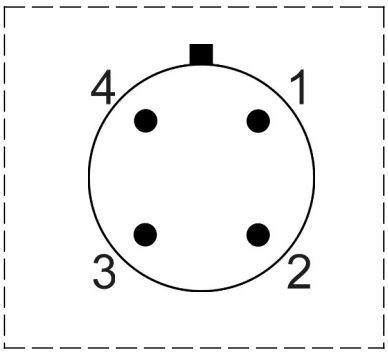
## 8.1 Analog-outputs

### 8.1.1 Options V218 - analog recorder output 4-20mA

When option V218 is installed, **2240 PROcheck** is equipped with a galvanic separated current output.

Resolution of the output current is dependent on sensor type installed and on the preset spread. During warm-up period and zero adjustment the recorder output is set to 4mA. This corresponds to a concentration of 0 g/m$^3$ or 0 ppm. During actual measuring the recorder output is set - prior to every pumping cycle - to the current which corresponds to the actually measured concentration. If an underflow of the measuring range occurs, the output is set to that current value which corresponds to the lower limit of the measuring range.

The nominal resistance on the output should be 100 Ohm.




Pin 1: GND
Pin 3: Signal

**Fig. 11**
4-pin Binder-Connector, pin assignment analog out

Depending on the total measuring range the following values arise as a result of spreading:

Spreading 1:
The entire range is scaled on 4mA to 20mA.

Spreading 10:
A tenth of the entire range is scaled on 4mA to 20mA.

Spreading 100:
A hundredth of the entire range is scaled on 4mA to 20mA.

### 8.1.2 Option V220 - analog recorder output 0-10V

When option V220 is installed, **2240 PROcheck** will be equipped with a galvanic separated voltage output.

The resolution of the output voltage is depending on sensor types installed and on the preset spread. During warm-up time and zero point measuring the recorder output is set to 0 Volt. This corresponds to a concentration of 0 g/m3, or 0 ppm. During actual measurement the recorder output is being set prior to every pump cycle to that voltage which corresponds to the actually measured concentration. If an underflow of the measuring range occurs, the output is set to that voltage which corresponds to the lower limit of the measuring range.

The pin assignment is identical to option V218.
See also fig. 11.

As a result of spreading the following values results:

Spreading 1:
The entire range is scaled on 0 Volt to 10 Volt.

Spreading 10:
A tenth of the entire range is scaled on 0 Volt to 10 Volt.

Spreading 100:
A hundredth of the entire range is scaled on 0 Volt to 10 Volt.

## 8.2 Option V252 – Internal Gas Flow Control

On demand the measuring gas unit can be equipped with gas flow control.

The advantage of this optional equipment is in the complete monitoring of gas flow. If the flow is restricted by external reasons or if the built-in pump has a malfunction, the error message **"Pneumatic system"** occurs.

The internal gas flow control circuit reacts under following conditions:

- Gas inlet tubing restricted or blocked
- Gas outlet tubing restricted or blocked
- Malfunction of the internal pump
- Internal valves faulty
- positive- or negative pressure over the Sensor too high (flow resistance of tubing too high, hoses too long)

If malfunction of the internal pump is the reason for flow-alarm, pump must be changed by the manufacturer or authorized service personnel.

**Please refer to Annex A, Chapter 3**

## 8.3 Option V253 - External Memory (USB-Stick)

With option V253 it is possible to store average values permanently. As storage medium a commercial USB-Stick is used.

The maximum number of recordable average values depends on the capacity of the USB-Stick used:

| | | |
|---|---|---|
| with a capacity of | 256 Mbytes approx. | 4 million values |
| with a capacity of | 512 Mbytes approx. | 8 million values |
| with a capacity of | 1024 Mbytes approx. | 16 million values |

The number of resulting operation hours depends on the chosen average-time, the available capacity on the USB-Stick and the number of already stored data files.

The values are recorded in text-file format (ASCII). The readout can easily be done by a USB-interface on e.g. your PC. With the PC the transferred data can be processed by numerous spreadsheet programs.

### 8.3.1 Storage of average values

The average values are stored automatically, if the USB-Stick is inserted.

**Insertion and removing of the USB-Stick may never be done during write operation (green light beside stick off)! Non-complying to this rule may result in the total loss of stored data!**

If the instrument is switched off, the USB-Stick may be changed at any time.

Some USB-Sticks are equipped with a write protection switch. If this switch is on, this will result in an error message "**USB-Stick error**" and the measuring operation will be continued without storing data. To continue storing, the switch must be turned off.

If there is no memory stick inserted during the startup of the **2240 PROcheck**, a warning message "**USB-Stick missing"** together with a 20 second acoustical signal is given. Subsequently the instrument automatically continues with the normal start up procedure. It is possible to insert a USB-stick at any time. The instrument will recognize the stick and start storing data.

A ready-for-use USB-Stick is attached to each equipment, which is delivered with the option V253-USB.

**A new USB stick must be formatted with the file system FAT before usage. Please perform this using your PC.**

If during the writing procedure a malfunction of the USB-Stick is encountered, the instrument issues an error message **"USB-Stick error"** on the display and the storage operation is discontinued.

The files which hold the measured values are being stored in the subdirectory "DATA" of the USB stick. If the subdirectory does not exist, it will be generated automatically. The filename consists of the actual calendar date in the form YYMMDD and the ending CSV.

The file directory will look like:

| | | |
|---|---|---|
| e.g. | 070901.CSV | File of 01.09.2007 |
| | 070902.CSV | File of 02.09.2007 |
| | . | |
| | . | |
| | 071006.CSV | File of 06.10.2007 |

If calendar date is changing, a new file with the new date will be generated.

The values are stored after each completion of the configured averaging interval. The values are stored in the following format:

```
dd:mm:jj;hh:mm:ss;0000,0;0000,0;0000,0;00000;00,0;0;0;9999; CRLF

(Date;Time;Zone1;Zone2;Zone3;Patm;tBOX;C;E;SN; CRLF)
```

where **Patm** is atmospheric pressure [mbar],
**tBox** is the instruments temperature [°C],
**C** is a code for measurement unit [ppm=1, mg/m$^3$=2],
**E** is an Error Code,
**SN** is the instruments serial number.

The error code is masked by ASCII code, starting with 65, that is the '**A**'.
The channel, which was active, when the error occured, is marked with a value of '**999999**' in the error record.

Error codes, translation

A: 'Pneumatic System'
B: 'Infrared Source'
C: 'Chopper Motor'
D: 'Sensor Heater'
E: 'Zero Setting'
F: 'Err Factory Cal.'
G: 'Secondary Signal'
H: 'RTC'
I: 'Cell Temperature'
J: 'AD Converter'
K: 'EEPROM'
L: 'Error CFG-Data'
M: - not used -
N: 'Sys.in.Conf.Mode'
O: 'USB-Stick Fault'
P: 'No USB-Stick'
Q: - not used
R: 'Modem offline'
S: 'Modem no service'
T: 'Modem no antenna

If no error, error code is '0' (Zero)

Example of recorded values:

```
01.09.2010;13:45:07; 126,6 ;   0   ;   0   ; 963 ; 26,5;2;0;5888
01.09.2010;13:50:07;   0   ;  38,1 ;   0   ; 963 ; 26,5;2;0;5888
01.09.2010;13:55:07;   0   ;   0   ; 378,4 ; 963 ; 26,5;2;0;5888
07.09.2010;14:00:07;9999999;   0   ;   0   ; 963 ; 26,5;2;A;5888
```

In the example above the averaging time is five minutes and instrument is cyclically measuring on all three points. The atmospheric pressure is 963 mbar and the temperature inside the instrument is 26.5°C. The instrument is measuring in $mg/m^3$ and on the last record a pneumatic fault occured. The pneumatic fault was on channel 1. The serial number of the instrument is 5888.

### 8.3.2 Readout and erasure of USB-Stick

Readout and erasure of the USB-Stick is performed using the USB-interface on your computer. Please follow the instructions of the PC's manufacturer when performing such a job.

## 8.4 Option V260 – Internal GSM Modem

With option V260 it is possible to transmit average values to a personalized account on www.ppm-log.com. A customer-selected GSM network is used for transmission. The instrument is equipped with a built-in modem, where the user-supplied SIM-card is installed at the manufacturer's facilities. The modem is programmed to work only with this specific SIM-card to avoid abuse. The antenna is panel-mounted directly on the instrument.

**For error-free operation of the modem it is of essential imperative that the antenna is mounted correctly to the connector on front panel. Hand-tighten the mounting thread and put the antenna in an upright position.**

**WARNING! STRONG RF FIELD!**

**During operation of the 2240 PROcheck monitor always keep a minimum distance of 25cm (10 inch) from the antenna to your body or the bodies of other persons!**
**Non-observance of these instructions can result in personal injury.**

### 8.4.1 Transmitted values and additional services

The transmitted data records correspond to those, recorded by the USB-memory option V253 (refer to 8.3 Additional Memory USB-Memory Stick). The preset time interval for the mean values applies for modem operation, too

The Error codes are translated to clear text by the website's database.

Furthermore it is possible to set alarm and error messages via eMail, almost in real time. The eMail-service is user definable directly on the admin pages of the user's account(s).

### 8.4.2 Operating frequencies

The modem applied is a quad-band-modem and able to work nearly worldwide (not South-Korea and Japan). The main operating frequencies are fixed by the firmware of the modem and depend on the area of operation. They are GSM 900 and DCS 1800 (Europe) or GSM 850 and PCS 1900 (USA, South America).

### 8.4.3 International roaming

The modem is able to carry out 'International Roaming' (within the available programmed frequency band). Due to the possibly arising high connection and operating cost this function may be deactivated by default. In general this function is activated.

### 8.4.4 Operation

After POWER ON of the **2240 PROcheck** monitor the modem attempts to set up a permanent connection to the www.ppm-log.com website. After the stabilization phase of the sensor temperature a message is displayed informing the user about the network strength (if network is available). If network is not available or network strength is too weak, an error message will be displayed.
In case of a bad connection the modem permanently attempts to set up a new connection (independent of the normal measurement operation of the **2240 PROcheck** monitor).

The data transfer volume depends on the preset time interval for the mean values. If 30-minute mean values are chosen, the data transfer volume lies below 5 MB per month, even if the monitor is operated continuously at 24/7.

During operation the network power is periodically displayed on the right, top of the display instead of the time.

# Annex A: Installation

## 1. Installation site.

In order to warrant a trouble-free operation of the Gas Monitor **2240 PROcheck** the equipment should be installed in a vibration-free installation site.

The installation location is to be selected in such a manner that the instrument may be operated and read with ease. It is equally important that the activated carbon filter installed behind the instrument front panel is easily accessible for scheduled filter replacement.

For cooling purposes the instrument must be set up in such a manner that free circulation of the ambient air is unobstructed. On the other side it must also be protected from exposure to very dusty environment or to splash-water.

**In practice a clearance of at least 5 cm (2 inches) away from any surrounding wall must be kept to permit proper cooling.**

The instrument has been designed for operation in an ambient temperature range from +10°C (50°F) up to +40°C (104°F) maximum. Condensation of air humidity is to be avoided. An integrated protection mechanism will switch off the measuring operation if the maximum permissible internal temperature is exceeding a limit of + 55°C (131°F). In this case the instrument will issue a malfunction message.

## 2. Electric connection

| | |
|---|---|
| Nominal Supply voltage: | 90 - 264 Volt AC |
| Frequency: | 47 - 63 Hz |
| Power Consumption: | max. 65 W |

Connection of the instrument to the mains should be secured with a safety fuse (e.g. automatic fuse 8 A) and it should be separated from the mains connection of the plant resp. machine. If both connections are circuited together there is a danger of infiltration by electromagnetic bursts via such direct connection with the plant. Securing such problematic interconnection against electromagnetic disturbance would be an alternative.

## 3. Sample gas connection

**Since pressure differences between sample gas- inlet and -outlet influence the measurement result and if exceeding differential pressure of 50 mbar (0.7 psi) they might even damage the sensing detector, it is essential that gas samples tapped from the plant are returned to the plant through a port very close to the suction point!**

The sample-gas feed hoses must be provided with a dust filter version 2 (see also **chapters 7.3**).The filters must correspond to the requirements as per **chapter 3.1** and be installed at the beginning of each gas hose. By means of the filters the measuring instrument and the measurement system hoses are protected against pollution. Suitable filters are of such quality that they will neither adsorb measurable gas components in the filter element nor in the filter housing. As an additional feature the filters must permit the filtration of particles size 5 micrometers.

**In order to avoid pollution of valves and of measuring chamber, the instrument may only be operated with filters protecting all measuring channels. The filters are to be placed right behind the valves at the plant respectively at the sample gas port.**

Polluted gas hoses will adsorb molecules of the gas components to be measured and will lead to incorrect measuring results, i.e. the sample gas arriving at the measuring instrument is picking up additional molecules of the gas under test from the hose walls and is therefore reaching a higher concentration than at the sample gas port. Although this 'enriched' concentration will decrease continuously, it will, nevertheless, in correlation to the degree of hoses pollution delay the indication of the true concentration value.

**For protection of measuring hoses and of measuring chamber please use genuine particle filters supplied by ppm**

All hoses should be made of **PTFE (Teflon)** or **FEP** in order to avoid adsorption which may cause faulty measurement results.

**Do NOT use Nylon- or Silicon - hoses by any means!**

The length of the hoses (diameter of 6/4 mm) must in a normal case not exceed 100 meters (330 ft), since pump timing and measuring cycles are optimized on the base of this length.

If a given situation at the plant requires different hose lengths or diameter, then the necessary steps have to be coordinated with ppm Messtechnik GmbH before installation.

**Take utmost care to prevent liquids from penetrating into the measuring chamber. Equally important is the avoidance of humidity condensation in the measuring cell. Any such event will immediately lead to the destruction of the sensor system!**

## 4. Interface Cable

The electrical control connection between instrument and plant-/machine -control is provided for by a prepared cable. For details please see **figures. A3 and A4** on the subsequent pages.

To avoid harmful influence of electric radiation into the instrument, the shield of the cable has to be connected to the machine/plant ground.

## A1: Description of Interface 2240 PROcheck - Plant Control

### a) Signals from Plant Control to 2240 PROcheck:

| Description | Code Signal | 24 V to Pin No. | GND to Pin No. | Action 2240 PROcheck |
|---|---|---|---|---|
| Plant ON | CRON | 13 | 10 | Request for measurement will be accepted if ready for measuring |
| Request for measurement on channel CHA1 | MRQ1 | 12 | 10 | starts measuring cycle on channel CHA1 Pin 6+19 open |
| Request for measurement on channel CHA2 | MRQ2 | 24 | 10 | starts measuring cycle on channel CHA2 Pin 5+17 open |
| Request for measurement on channel CHA3 | MRQ3 | 11 | 10 | starts measuring cycle on channel CHA3 Pin 3+16 open |
| Alarm is acknowledged | AQUIT | 23 | 10 | Alarm is reset Pin 2+14 open |

### b) Signals from 2240 PROcheck to Plant Control: (Contact configuration “NC”, see chapter 2.2.2)

| Description | Code Signal | Output |
|---|---|---|
| Instrument. ready for measurement | PMSR | Pin 8+20 closed |
| Result on channel CHA1 is < main alarm | MOK1H | Pin 6+19 closed |
| Result on channel CHA2 is < main alarm | MOK2H | Pin 5+17 closed |
| Result on channel CHA3 is < main alarm | MOK3H | Pin 3+16 closed |
| Result on channel CHA1 is < pre alarm | MOK1V | Pin 6+18 closed |
| Result on channel CHA 2 is < pre alarm | MOK2V | Pin 4+17 closed |
| Result on channel CHA3 is < pre alarm | MOK3V | Pin 3+15 closed |
| Alarm or Failure | ALARM | Pin 2+14 closed |

## c) Signals from 2240 PROcheck to Plant Control: (Contact configuration “NO”, see chapter 2.2.2)

| Description | Code Signal | Output |
|---|---|---|
| Instrument. ready for measurement | PMSR | Pin 8+20 closed |
| Result on channel CHA1 is < main alarm | MOK1H | Pin 6+19 open |
| Result on channel CHA2 is < main alarm | MOK2H | Pin 5+17 open |
| Result on channel CHA3 is < main alarm | MOK3H | Pin 3+16 open |
| Result on channel CHA1 is < pre alarm | MOK1V | Pin 6+18 open |
| Result on channel CHA 2 is < pre alarm | MOK2V | Pin 4+17 open |
| Result on channel CHA3 is < pre alarm | MOK3V | Pin 3+15 open |
| Alarm or Failure | ALARM | Pin 2+14 open |

## d) Signals from 2240 PROcheck to Plant Control: (Contact configuration “Window”, see chapter 2.2.2)

| Description | Code Signal | Output |
|---|---|---|
| Instrument. ready for measurement | PMSR | Pin 8+20 closed |
| Result on channel CHA1 is < main alarm | MOK1H | Pin 6+19 open |
| Result on channel CHA2 is < main alarm | MOK2H | Pin 5+17 open |
| Result on channel CHA3 is < main alarm | MOK3H | Pin 3+16 open |
| Result on channel CHA1 is < pre alarm | MOK1V | Pin 6+18 closed |
| Result on channel CHA 2 is < pre alarm | MOK2V | Pin 4+17 closed |
| Result on channel CHA3 is < pre alarm | MOK3V | Pin 3+15 closed |
| Alarm or Failure | ALARM | Pin 2+14 open |

Notes:

1.) The voltage on CRON, MRQ(1..3) and AQUIT may be 24 V DC as well as 24 V AC.

2.) Max. admissible load at output contact: 48 V , 0,3 A

3.) An alarm indicated at channel-change will be quit by 2240 PROcheck automatically after 1 minute: Pins 2+14 open

## A2: Pin Assignment of Machine-Interface Connector

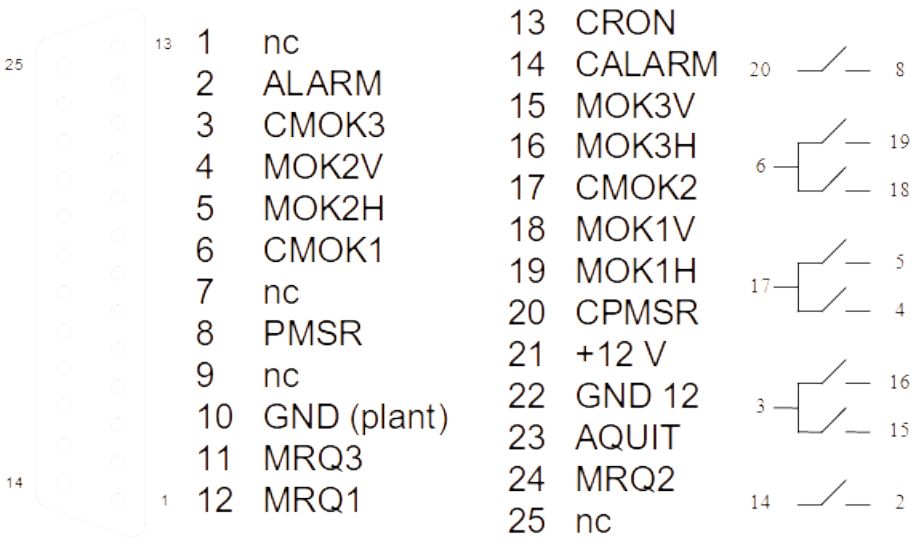



**Fig. A1**

output of machine control, input to 2240 PROcheck
24 V DC or 24 V AC
Pins 11, 12, 13, 23, 24 against GND, Pin 10

output of 2240 PROcheck, input to machine control
potential free contacts
Pins 2, 14 (Alarm)
Pins 6, 19 (MOK1H) - 5, 17 (MOK2H) - 3, 16 (MOK3H)
Pins 8, 18 (MOK1V) - 4, 17 (MOK2V) - 3, 15 (MOK3V)
Pins 7, 20 (PMSR)

**max. contact load 0,3 A, 48 V**

**Warning:**

**The voltage of 12 V DC at pin 21 (+12V) and pin 22 (GND 12) is for use with the Interface-Tester or the Switch-Box G03508 only! Never connect any external devices! There would be a galvanic connection to the instruments electronics! In case of short circuit or overload the MG-IF-Module can be damaged!**

## A3: Standard-Interface-Cable

(Example)

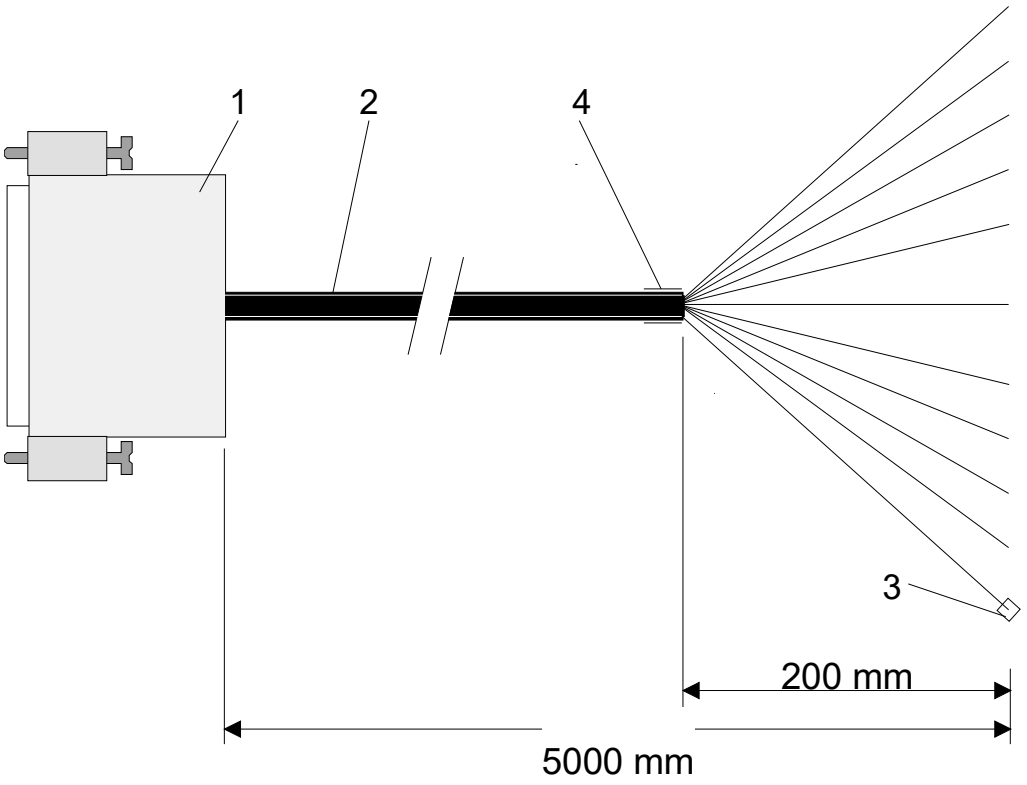



**Fig. A2**

1 connector, female, series sub-d, 25 pins
2 connecting cable, 16 wires (LiYCY 0.34 mm²)
3 core end sleeve
4 shrinking hose sleeve

## A4: Pin Assignment of Standard-Interface-Cable

(Example)

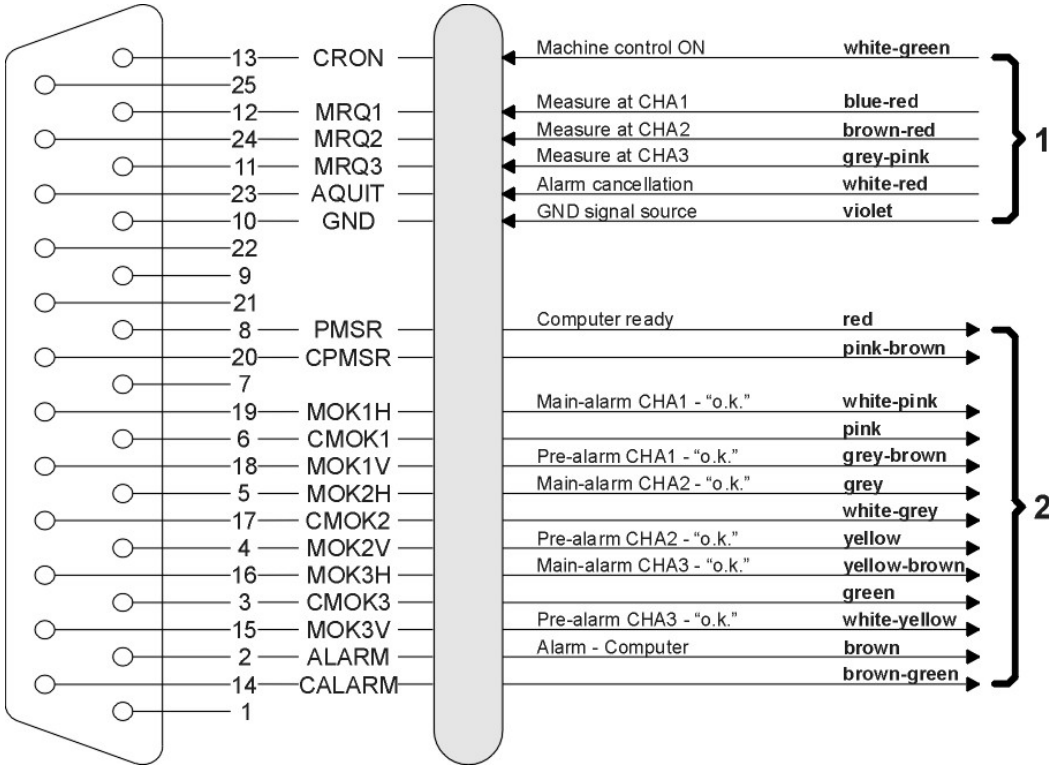



**Fig. A3**

connector, female, series sub-d, 25 pins
with connecting cable, 16 wires (LiYCY 0.34 mm²)
total length of I/F cable l = 5000 mm, with 200 mm free cable endings
soldering point protected by shrinking hose sleeve

1 output of machine control, input to 2240 PROcheck
24 V DC or 24 V AC

2 output of 2240 PROcheck, input to machine control
potential free contacts
contact load max. 0.3 A, 48 V

## A5: Consumables / Spare parts for 2240 PROcheck

| Order code: | Description: |
|---|---|
| | |
| G04044 | Particle filter 2 with 2 fast coupler (4mm / 6mm)  |
| G03328 | Particle filter 2 with 2 fittings (4mm / 6mm)  |
| G01538 | Activated carbon filter  |
| G03508 | Switch-Box (for 3-channel instruments without ext. control)  |
| G01327 | Mains cable  |

# Annex B: Technical Specifications GSM Modem (Option V260)

**Indication of restriction in use:**
**The use of this equipment requires a minimum distance from the body (25 cm or 10 inch).**

## 1. Safety recommendations

**The use of this product may be dangerous and has to be avoided in the following areas:**
**Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc.**
**Where there is risk of explosion such as gasoline stations, oil refineries, etc.**

It is responsibility of the user to enforce the country regulations and the specific environment regulations.

Do not disassemble the product; any mark of tampering leads to loss of warranty.

Every unit has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (25 cm).

## 2. Conformity Assessment Issues

The Telit GC864-Quad-PYT GSM/GPRS-modems are conforming to the following European Union Directives:

- R&TTE Directive 1999/5/EC (Radio Equipment & Telecommunications Terminal Equipments)
- Low Voltage Directive 73/23/EEC and product safety Directive 89/336/EEC for conformity for EMC

Furthermore the used Telit GC864-Quad-PYT GSM/GPRS-Modem is FCC Approved.

The GSM/GPRS-Modem is conforming with the following US Directives:

- Use of RF Spectrum. Standards: FCC 47 Part 24 (GSM 1900)
- EMC (Electromagnetic Compatibility). Standards: FCC 47 Part 15

To meet the FCC's RF exposure rules and regulations:

- The system antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all the persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
- The system antenna used for this module must not exceed 1.4dBi (850MHz) and 3.0dBi (1900MHz) for mobile and fixed or mobile operating configurations.
- Users must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Registration codes:

- Anatel: 0745-08-2618
- FCC ID: RI7GC864
- IC: 5131A-GC864

## 3. Declaration of Conformity

**Declaration of Conformity for**
**Telit GC864-Quad-PYT GPRS/GSM-Modem,**
**optionally installed in IR-Spectrometer 2240 PROcheck:**

We, ppm Messtechnik GmbH, Gartenweg 1a, 85614 Kirchseeon, Germany, declare that our optional accessory GPRS/GSM-Modem (Telit GC864-Quad-PYT), used in our IR-Spectrometer 2240 PROcheck, is in conformity with the appropriate standards

- ETSI EN 301 511: v.9.0.2
- CENELEC EN 60950:2001
- ETSI EN 301 489-1: v.1.4.1
- ETSI EN 301 301-7: v.1.2.1

following the provisions of Radio Equipment and Telecommunication Terminal Equipment directive **1999/5/EC**.

Kirchseeon, March 2014

CE 0168

Horst König,
CEO of ppm Messtechnik GmbH