Operating instructions

Industrial Dust Measuring Device

SMG200M

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At the time of printing, all of the information and illustrations contained in this document were fully up to date. Technical details are subject to change.

This document is made with the necessary accuracy. SAXON Junkalor GmbH assumes no liability for remaining errors or omissions as well as damages resulting therefrom.

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NOTICE!

Read these instructions before you operate the machine.

Keep the operating instructions in an easily accessible place as you may need it later.

Contents

I. Foreword

The following operating instructions give you all the information you need for the stable and proper operation of the SMG200M Dust Measuring Device.

In this document, the generic masculine noun is used. However, male as well as female personnel are meant.

Should you have any questions, our service can be reached at +49 340 5510 214.

II. Purpose of these operating instructions

This document describes the Dust Measuring Device SMG200M.

It contains basic information, safety instructions, functional description, information concerning putting into service, operation, repair and maintenance, fault location and troubleshooting, disassembly and assembly as well as data for communication.

All instructions and descriptions are valid for the lifetime of the SMG200M Industrial Dust Measuring Device, including the end of operation and disassembly. It is imperative to follow the instructions mentioned in this operating manual. Technical changes and manipulations are forbidden.

SAXON Junkalor GmbH accepts no reliability for damages of any kind that arise from failure to comply with these operating instructions and especially the safety instructions.

This document also contains explanations of the purpose and the required conditions of the device.

III. Scope of delivery

The standard scope of delivery includes the following components:

1. industrial dust measuring device SMG200M
2. zero point filter
3. 1 power cord with grounding-type plug socket (type C 15; max.: 250 V/10 A)
4. 1 set of spare fuses (T2L250V)
5. 1 cleaning set containing optical cleaning wipes and cleaning brushes
6. 1 seal ring for the filter cap
7. 1 USB flash drive with operating instructions

The following components are additional included depending on the model:

- probe 300 mm (12“) 90° for pipes
- probe 1100 mm (43“) 90° for pipes
- flexible diesel probe for exhaust tailpipe measurement

The following components can be included optionally:

- spare filter inserts
- PC program

IMPORTANT

Verify the completeness of the delivery!

Missing or damaged parts must be reported to the service immediately.

1. Safety Instructions

1.1. Structure of the Safety Instructions

The safety instructions in these operating instructions are structured as follows:

	SIGNAL WORD
Safety alert symbol	**Type and source of the danger.** Consequences of failing to heed the danger. • Measures to avoid the danger.

1.1.1. Differentiation of the Hazard Levels

	DANGER
	**Characterises an immediate danger.** If the danger is ignored, death or serious injuries will result. • Measures to avoid the danger.

	WARNING
	**Characterises a possible danger.** If the danger is ignored, death or serious injuries may result. • Measures to avoid the danger.

	CAUTION
	**Characterises a possible danger.** If the danger is ignored, minor or slight injuries may result. • Measures to avoid the danger.

	NOTICE
	**Characterises a possible hazardous situation.** If this is ignored, damage may occur to the plant or to the area around it. • Measures to avoid the hazardous situation.

	IMPORTANT
	Contains useful additional information that simplifies the understanding and operation of the device.

The following safety alert symbols are used in this document:

Symbol	Meaning
	This safety alert symbol characterises a general, not further specified danger. It is used in situations where the depiction of a specific hazard is not possible.
	This safety alert symbol characterises electrical hazards.
	This safety alert symbol characterises hot surface hazards.
	This safety alert symbol characterises flammable materials hazards.
	This safety alert symbol characterises toxic materials hazards.

1.2. Intended Use

SMG200M is a dust measuring device for mobile use. It is an industrial measuring system that extracts a partial flow of a gaseous medium by hot-extraction, measures and displays the particle mass concentration contained therein in real time.

The SMG200M is not appropriate for measuring flammable (explosive) gases and gas mixtures. It is not allowed to use the SMG200M in explosive environments.

Keep the measuring system free from condensate. The SMG200M is designed for condensate quantities accrued in incinerator. Remove any condensate from the condensate trap after each measurement and drain it via the condensate drain tap. If you are still unsure about the condensate quantity, contact our service.

Do not expose the device permanently to direct sunlight.

Observe the safety instructions on the back cover of the device.

If the device is used in any other way than intended in this instruction manual, the sole responsibility therefor will pass over to the operating company.

1.2.1. Reasonably Foreseeable Misuse

The reasonably foreseeable misuse listed here makes no claim to be complete. If necessary, documented incidents have to be added to the list.

Reasonably foreseeable misuse:

- improper or poor maintenance
- use of unintended components, e.g. spare parts not approved by SAXON Junkalor GmbH
- non-compliance with the safety instructions
- overriding safety devices
- unauthorized extension and conversions of the device
- operate the device in a technically incorrect condition

2. Technical Data

2.1. Operating Conditions

Ambient temperature:	+ 5 °C ... + 40 °C
Relative humidity:	< 75 % annual average 90 % on max. 30 days a year, condensation is not allowed
Air pressure:	860 ... 1060 hPa
Position while operating:	horizontal or inclination of max. 15° in all directions upside down ± 30° in all directions
Sound pressure level:	< 75 dB

2.2. Transport and Storage Conditions

Ambient temperature:	- 25 °C ... + 65 °C
Relative humidity:	< 95 %

2.3. Measuring Parameters

Measuring range:	0,2 ... 250 mg/m³ (DEHS)
Measuring precision:	<± 5 % (DEHS)
Resolution:	10 µg/m³ ± 1 Digit
Repeatability:	<± 3 %
Particle sizes	0.05 µm ... < 10 µm
Reference:	normed at Dioctyl Sebacate

2.4. Particle Extraction

Gas temperature:	< 500 °C
Flow:	2.88 Nl/min ± 5 % (automatic regulated)
Dew point:	< 80 °C
Extraction probe:	hot-extractive
Gas transport temperature:	continuous 100 °C
Extraction point pressure:	air pressure from - 100hPa (1.4PSI) to + 200hPa (2.9PSI)

2.5. System Times

Time constant:	< 15 s
Warm-up time:	< 10 min
Gas calibration:	2 min

2.6. Interfaces

RS-232:	115200 bps; 1 stop bit; no parity, no hardware protocol
Wireless data transfer:	according to IEEE 802.15.1 Class 1 (max. 100 m)

2.7. Construction and Assembly

Type:	mobile measuring system
Housing material:	aluminium
Housing dimensions:	210 x 275 x 375 mm^3
Housing protection type:	IP 40
Weight:	7.5 kg (16.5 lbs)

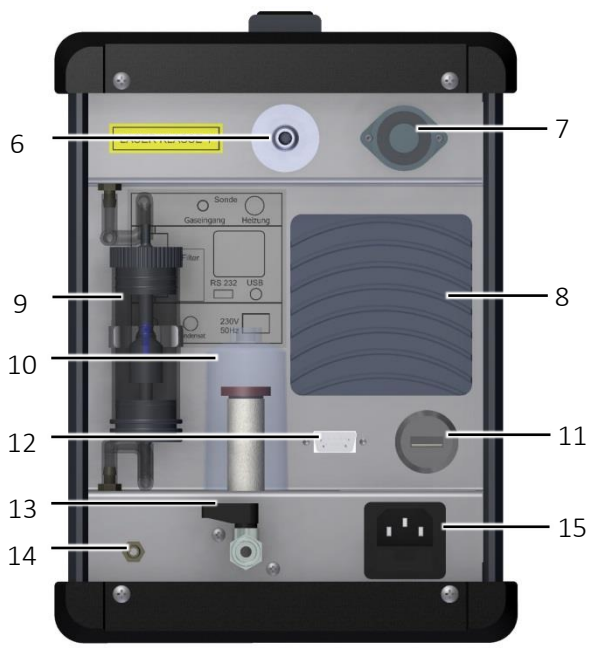
2.8. Voltage Supply

Mains input socket:	3-pin device socket (Type C15)
Mains voltage:	230 VAC +10 %/-15 %
Mains frequency:	50 Hz ± 2 %
Power consumption:	350 VA incl. probe

3. Construction and Function

Front side

Back side



Pos.-No.	Designation	Pos.-No.	Designation
1	Handle	9	Condensate trap with collecting container
2	Protective cover	10	Filter with condensate collector
3	Touch screen display	11	USB 2.0 port
4	Power switch	12	RS-232 port
5	Bluetooth® antenna (faceplate)	13	Condensate drain tap
6	Gas input	14	Gas output
7	Electrical probe port	15	Power port with fuse holder
8	Cooler		

[1] Handle

Do not attach any additional elements to the handle that can change the shape of it.

[2] Protective cover

Protective cover secures the front and rear sides against damage.

[3] Touch screen display

All inputs and outputs on the device are made via the touch screen display. It is used to display the measured values, parameters and data of the SMG200M.

[4] Power switch

The power switch turns on and off the SMG200M. It contains a power indicator.

[5] Bluetooth® antenna (faceplate)

Behind the faceplate is a class 1 Bluetooth® antenna with a range of up to 100 m. This enables the transmission of device and measurement data by wireless data transmission according to IEEE 802.15.1 to other Bluetooth®-compatible devices. List of possible commands, see Annex II – Communication (Option), 3 Set of Commands.

[6] Gas input

The probe is attached to the gas input.

NOTICE

Damage to components when resting on the extraction hose.

Gas input or extraction hose may be damaged.

- Do not pull or press the gas input.
- Do not rest on the plugged probe.

[7] Electrical probe port

Power supply to the probe is provided through this connector.

[8] Cooler

Cooler regulates the temperature inside the device.

[9] Condensate trap with collecting container

Condensate trap with collecting container collects the water contained in the exhaust gas during the measurement. The water can be disposed of by wastewater.

NOTICE

Damage to components when the filling level in the collecting container is exceeded.

Device may be locked and provide incorrect measuring data.

- Check condensate trap after each measurement.
- Empty the collecting container after each measurement, see 7.3 Empty the Condensate Trap with Collecting Container.

[10] Filter with condensate collector

Filter cleans the gas of dust particles. In addition, the remaining condensate is collected in the condensate collector. Change the filter inlet depending on the contamination, see 7.2 Change the Filter Inlet.

NOTICE

Contamination on the filter inlet may cause malfunction.

Device may provide incorrect measuring data.

- Check filter inlet after each measurement and change if necessary, see for further information 7.2 Change the Filter Inlet.
- Check the condensate collector after each measurement and empty it through the condensate drain tap [13] if necessary.

[11] USB 2.0 port

This port is designed for connection of USB 2.0 flash drive, capacities up to 8 GB. When it is detected by SMG200M, the free memory capacity of the device is displayed.

[12] RS-232 port

SMG200M can be connected to a PC via the RS-232 port. List of possible commands, see Annex II – Communication (Option), 3. Set of Commands.

[13] Condensate drain tap

The condensate is drained off through the condensate drain tap. Condensate drain tap must be closed during the measurement.

[14] Gas output

Gas outlet is equipped with a small piece of tube. This tube forwards the residual condensate, which escapes together with the gas, away from the device. Pipe the harmful measuring gases leaving the device through an exhaust hose outside. The exhaust hose is not included in scope of delivery (order no.: 40066).

WARNING

Measuring gas is not completely filtered during the measurement and may contain harmful particles after the measurement.

If harmful gases are measured, they are harmful even when they leave the device. If the operator inhales the exhaust gases directly, it can lead to health problems.

- Do not inhale measuring gas directly.
- Pipe the harmful measuring gases through an exhaust hose outside.
- Do not close the gas output.

[15] Power port with fuse holder

Mains connection (230 V, 50 Hz, max 350 VA with probe) can only be used with the supplied mains cable. To replace the fuses in the fuse holder, see 7.5 Replace the Fuses.

3.1. Probe

The extraction probe including extraction hose can be ordered.

The extraction probe consists of a heated extraction hose and a measuring head. The heating prevents the condensation of the water. The gas input [6] and the measuring head are equipped with a quick release.

To connect, attach the extraction hose to the gas input quick release [6] so that it snaps into place. Attach measuring head to the extraction hose so that it snaps into place.

To remove the probe, press the white button and pull off the extraction hose straight.

CAUTION

Surface of the gas input is hot after removal of the probe.

Slight burns can be the result.

- Do not touch the gas input after removing the probe.

Observe the following instructions when using the extraction probe:

- Do not extend the extraction hose.
- Bending radius is not less than 17.5 cm (0.57 ft). This also applies to the rolling of the hose.
- Do not compress, kink, squeeze or twist the hose.
- Lay the hose so that the connections are at the same level.
- Avoid permanent movement of the hose during operation.
- Lay the hose so that its heat can be released freely to the circulating air.
- Clean the extraction hose regularly, see 8.1 Cleaning after a Measurement.
- Protect the extraction hose from high outside temperatures.
- Use only the electrical probe port provided on the device.
- Outer heating of the extraction hose to reduce the heating time is not permitted.
- The same conditions apply to the extraction hose as for the SMG200M, see 2.1 Operating Conditions.

4. Putting into Operation

4.1. Measuring Principle

The SMG200M operates with the light scatter technology. Scattered light is caused by scattering of light at boundary surfaces.

A laser generates a light beam. If particles move through the laser beam in the measuring chamber, the light from the laser is scattered in different directions on its surface. This scattered light is recorded and measured by several optical detectors which are arranged at different angles to the laser beam. The measured values at the detectors are proportional to the particle mass concentration in the gas flow.

Since different particles have different scattering properties due to colours and shapes, it is necessary to qualify the SMG200M at the appropriate particle type.

4.2. Requirements

The device may only be operated with the accessories and spare parts approved by SAXON Junkalor GmbH.

Service work may only be carried out by certified specialist personnel.

Repairs may only be carried out by the manufacturer or the service personnel commissioned by SAXON Junkalor GmbH.

Because the measurement results depend not only on correct functioning of the device, but also on different operating conditions, the measurement results must be checked for plausibility by a specialist before being applied in to continuative procedures.

If it is assumed that safe operation with the device is not possible, switch off the device and secure against unauthorized restart (e.g. pull power plug).

Operator is responsible for the permanent availability of the operating instructions at the place of installation.

4.3. Installation Position

Observe the permissible conditions of use, see 2.1 Operating Conditions.

Select position near measuring point and free of vibrations. An extension of the extracting probe is not permitted.

Place SMG200M on a horizontal stable surface, the inclination (deviation from the horizontal) must not exceed ± 15°.

Protect SMG200M from direct sunlight and strong heat radiation.

NOTICE

Damage to components and malfunction in case of insufficient air circulation.

Components can overheat and be damaged.

- Ensure sufficient air circulation.
- Prevent heat accumulation.
- Do not cover the device.

4.4. Selection of the Measuring Point

Carefully select the measuring point to ensure trouble-free and low-maintenance operation of the SMG200M and to obtain error-free measurement results. Note the following points:

- Exhaust gas flows laminar and free.
- Avoid bends and places where accumulation of pressure can occur.
- Extract exhaust gas only with the negative pressure/overpressure permissible for the SMG200M.

NOTICE

Damage to components and malfunction in case of excessive pressure differences.

Irreversible damage of the device and incorrect measurement results may be the result.

- At measuring points with overpressure, use an overpressure adapter (not included in the scope of delivery).

- Exhaust gas flow should be homogeneously mixed at the measuring point.
- Avoid measuring points in which assemblies (probes, electrostatic precipitators, etc.) are installed and impair direct flow of the exhaust gas.
- Exhaust gas should flow undisturbed to the sampling point at least a distance of two pipe diameters.
- Place the tip of the measuring head in the middle of the exhaust gas flow.
- Avoid high dew points.
- If a high dew point is unavoidable, drain the collected condensate through the condensate drain tap [13] after each measurement, for further information see 8.1 Cleaning after a Measurement.
- Power plug is freely accessible and can be pulled in a dangerous situation.

4.5. First-time Operation

Read the operating instructions completely before first-time operation.

4.5.1. Preparation of the Measurement

1. Perform visual inspection according to 7.1 Visual Inspection.
2. To connect the probe electrically, plug in the connector and tighten it hand-tight.
3. Attach the zero point filter to the gas input.
4. Place the tip of the measuring head at the selected measuring point.
5. Lead the exhaust hose to the outside.
6. Connect the SMG200M to the power supply using the enclosed mains cable.
7. Press the power switch [4].
   - ➢ It starts the warm-up phase, which can take up to 10 minutes, depending on the operating conditions. After the warm-up phase is completed, the main menu appears on the touch screen display.
8. Connect the SMG200M to the laptop/PC via RS-232 when using cable connection or via the Bluetooth® when using wireless connection.
9. Set language, date and time, see 5.2.8 Language / Time.
10. Determine the zero point before the first measurement, click "zero point filter" on the touch screen display and follow the on-screen instructions.

- Zero point will be determined. Zero point is a reference value used to calculate the measurements. Zero point must be determined after switching on the device. The determined zero point value remains set for further measurements until the device is switched off.

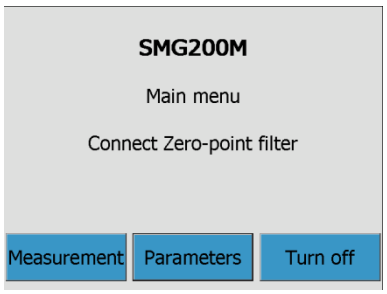
11. Pull off the zero point filter.
12. Attach the extraction hose to the gas input quick release [6] so that it snaps into place.
    - The SMG200M is ready to measure now.

5. Operation

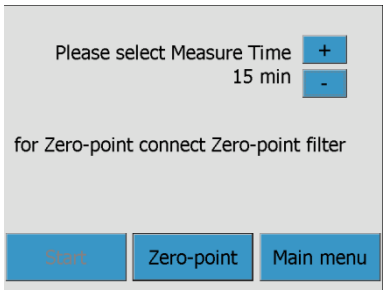
The SMG200M can be intuitively operated via touch screen display or remotely controlled by PC/laptop.

5.1. Performing Measurement

5.1.1. Start a Measurement



1. Prepare the SMG200M for measurement according to 4.5.1 Preparation of the Measurement.
2. Click „Measurement“ in Main Menu.
3. Set Measure Time with „+“/„-“.



4. Determine zero point, if no valid zero point is set, for further information see 4.5.1 Preparation of the Measurement.
5. Click „Start“.
   - ➢ Measurement is started. Measurement data are continuously displayed on the touch screen display.

The measurement ends automatically after the set measure time has elapsed.

NOTICE

Damage to components when resting on the extraction hose.

Gas input or extraction hose may be damaged.

- Do not pull or press the gas input.
- Do not rest on the plugged probe.

NOTICE

Damage to components when the filling level in the collecting container is exceeded.

Device may be locked and provide incorrect measuring data.

- Check condensate trap after each measurement.
- Empty the collecting container after each measurement, see 7.3 Empty the Condensate Trap with Collecting Container.

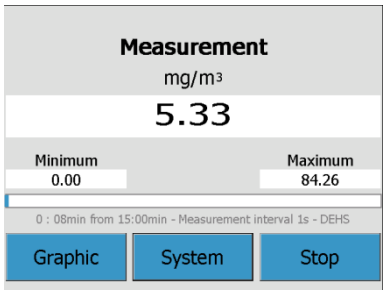
NOTICE

Damage to components and malfunction, when using the excessively contaminated filter inlet.

Device may provide incorrect measuring data.

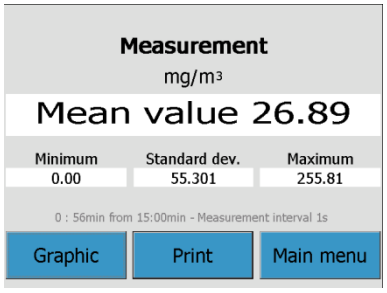
- Check filter inlet after each measurement and change if necessary, see for further information 7.2 Change the Filter Inlet.
- Check the condensate collector after each measurement and empty it through the condensate drain tap [13] if necessary, see 8.1 Cleaning after a Measurement.

5.1.2. Stop a Measurement



1. Click „Stop“.
   ➢ Measurement is interrupted.

5.1.3. Display the Measured Values



1. Click „Graphics“.
   ➢ Measured values are displayed as graphics.

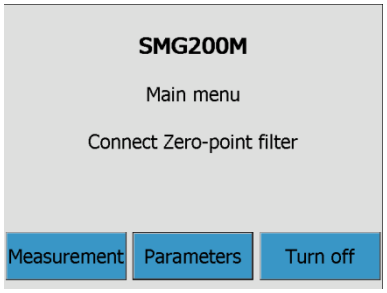
5.1.4. Print (Optional)

Print is an additional function that can be released with a code. The release code can be purchased by our service team.

Measured values and measuring parameters of the last measurement can be printed out. This function can only be performed via RS-232 connection. The Bluetooth® interface is not supported.

Following parameters for the RS-232 connection are supported: 9600 bps, 8 bits, no parity, 1 stopbit.

5.1.5. Turn-Off



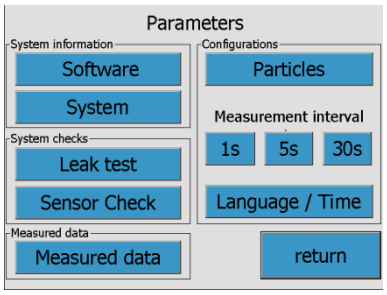
The turn-off function supports cleaning and maintenance of the SMG200M.

1. Attach the zero point filter to the gas inlet [6].
2. Click „Turn-Off“.
   ➢ The process of turning off starts: clean air with low dew point circulates through the SMG200M for several minutes; particles that are still in the measuring system are flushed out; remnants of humidity or condensate are dried off.

Turn-off function can be interrupted at any time:

1. Click „Main Menu“.
   ➢ Turning off is interrupted. It starts warm-up until the SMG200M is ready to measure.

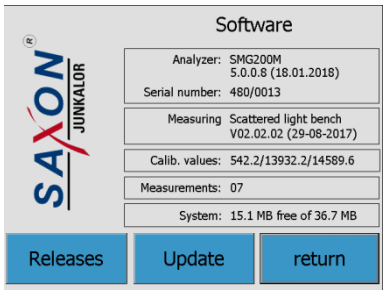
5.2. Parameter Menu



The following functions can be set by "Parameters":

Designation	Functions
Software	software version, serial number, measure counter
Update	installation of new software version
Releases	release of further types of particles and functions
System	system values, flow, zero point status, type of particle
Leak test	test the device for leaks
Sensor check	check the optical signal ways
Measure data	management of measured values (copy or delete)
Particles	selection of the desired particle type
Time interval	selection of the measuring frequency
Language and Time	selection of language, setting of time

5.2.1. Software

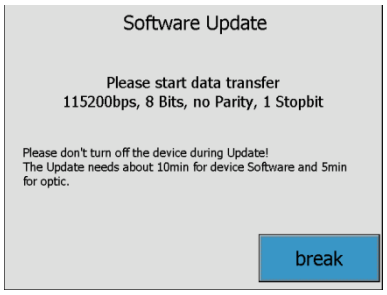


The version and serial numbers needed for telephone queries to our service team are displayed in the software menu.

The parameters of the sensor control and free memory in the device or on the connected USB flash drive are displayed.

The number of measurements is only increased if a measurement takes at least 3 minutes.

5.2.2. Update



The software of the SMG200M can be updated in the submenu "Software Update".

The USB flash drive with the update file is automatically identified as soon as the operator calls up the menu "Software Update" via the path "Parameter" → "Software" → "Update".

Update file with the .usr extension updates the optics firmware, file with the .ust extension updates the system software.

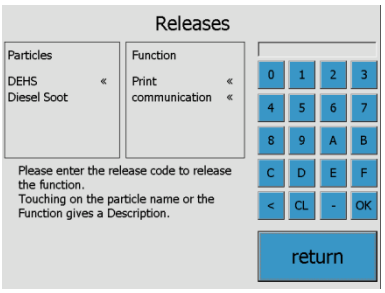
Not every combination of optics and system software is operable.

If the combination of both packages is not operable:

1. Restart the SMG200M.
2. Click "Software" → "Update" during the warm-up and install an operable update package.

Alternatively, updates can be installed from PC with a terminal program (e.g. free terminal program HTerm). To install the updates, connect the SMG200M via RS-232 connection or via Bluetooth® interface to the PC, for further information see Annex II – Communication (Option).

5.2.3. Releases



The submenu "Releases" shows included functions and particle types.

In addition to the standard particle type DEHS (di-ethyl-hexyl-sebacate), further particle types and functions can be purchased and released depending on the software version.

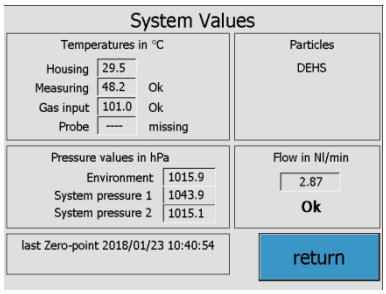
To release new functions or particle types, click "Software" → "Releases" and follow the on-screen instructions.

All further functions and particle types are described on the website www.saxon-junkalor.de.

Released functions or particle types can still be used after software updates.

Keep safe the release code, as it may be needed for reinstall after a device repair.

5.2.4. System

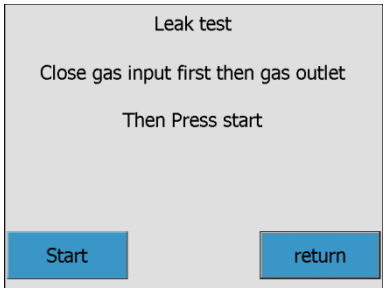


The current values of the device temperatures and pressures as well as the current flow rate can be viewed in the menu “System”.

The details of the last valid zero point are displayed. The actuality of the zero point will be indicated during a measurement.

The menu “System” will be automatically exited after 10 s during a measurement.

5.2.5. Leak test

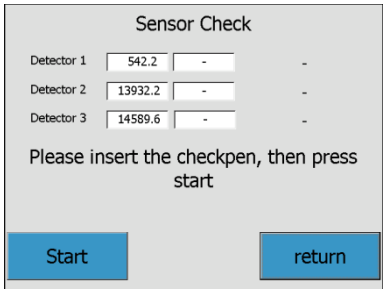


The “Leak test” checks the tightness of all gas ways.

The leak test takes approx. 20 s.

To perform the leak test, see 7.4 Perform the Leak Test.

5.2.6. Sensor Check

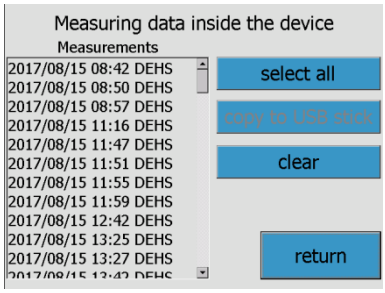


The parameters of the optical sensors and analogue amplifiers in the SMG200M will be checked in “Sensor Check”.

To perform the sensor check, a check pen is needed.

The check pen can be purchased and checked regularly by our service.

5.2.7. Measured Data

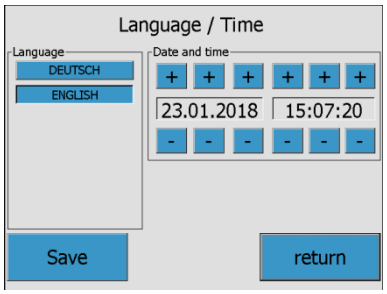


The “Measured data” menu displays the saved measurements.

Measurements can be selected and copied to a USB flash drive or deleted.

If the memory space in the SMG200M is less than 2 MB, the oldest measurements will be automatically deleted. Free memory space is displayed in the “Software” menu, see 5.2.1 Software.

5.2.8. Language / Time

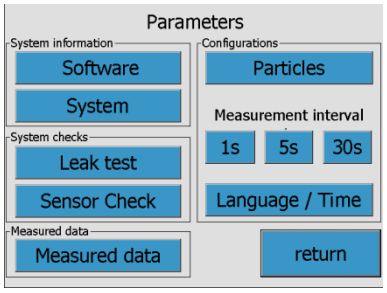


Language can be set here, select desired language and click on “Save”. Other languages can be purchased.

Set the date and time with „+“/„-“.

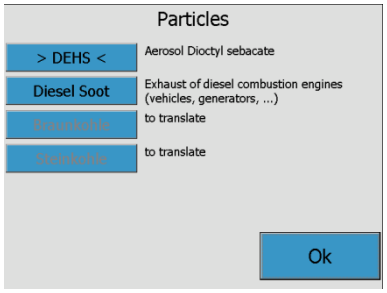
All measured data are saved with date and time.

5.2.9. Measurement interval



The desired measurement interval can be set here. The measurement interval determines the time between two measuring points. The currently set value is displayed to the right of the word measurement interval in seconds.

5.2.10. Particles



The “Particles” menu displays all released particle types. The particle types, which are not released, are greyed out, for the release of further particle types see 5.2.3 Releases.

The currently set particle type is highlighted. It remains set even after turning off until another particle type is set.

6. Communication (Option)

The communication function enables the remote control of the device and the request of measured data. A release code can be purchased for this function.

The function can be used wired via RS-232 connection (max 5 m) or wirelessly via the Bluetooth® interface (IEEE 802.15.1, class 1 to 100 m).

The password for the wireless connection is: 5510344

For a detailed description of the connections, the communication protocol and all commands see Annex II – Communication (Option).

The included USB flash drive contains a script with the commands for the terminal program HTerm.

6.1. Remote Control

When the SMG200M is ready for operation and a zero point is set, the measurements can be remotely controlled via RS-232 connection or wirelessly via the Bluetooth® interface.

Despite the remote control, all functions can be operated via touch screen display.

6.1.1. Start a Measurement

A measurement can be started with the preset parameters in the main menu or in the measuring time selection. The parameters can be changed via touch screen display before starting the measurement, see 5.2 Parameter Menu.

6.1.2. Stop a Measurement

The measurement will be stopped and the measurement results will be displayed. A renewed triggering of this function leads to the main menu.

6.2. Measured Data

The following options are available for the transmission of measured data:

6.2.1. Measured Value Enquiry

The measured value can be enquired during the measurement. If the query is performed several times within one measurement interval, the SMG200M sends identical data.

6.2.2. Continuous Measure Value Transmission

The measured value will be sent automatically after every measurement interval. This function is deactivated after turning on the SMG200M and must be activated by the user.

6.2.3. Minimum – Maximum – Mean Value

This function displays the lowest, highest and mean values of the measurement.

6.2.4. Data Logging

Measurements are saved at the device memory. Depending on the number of measurement intervals per measurement and the measurement duration, at least 30 measurements can be saved.

The "Data logging" function displays the list of measuring parameters. Saved measurements can be displayed individually.

If a USB flash drive is detected, the measurement data will be automatically saved on the USB flash drive. The USB flash drive up to max 8 GB can be supported. The measurements can also be subsequently copied from the device to a USB flash drive.

Measured data include the particle mass concentration, the standard deviation of the measured values recorded within the measurement interval, as well as the temperatures and the flow rate at the time of the measured value logging.

7. Service and Maintenance

The SMG200M is designed so that all service and maintenance works can be performed without tools.

Observe the following instructions for all service and maintenance works:

DANGER!

Hazardous voltages.

When removing covers, live parts may be exposed.

- Disconnect the power plug before service and maintenance.
- Service and maintenance works only to be performed by qualified personnel.

NOTICE!

Damage to components and malfunction.

The device may be damaged.

- Use only supplied spare parts.
- When replacing the fuse, use fuses of the specified type and with the same rated current.

NOTICE!

Damage to components and malfunction.

The device may be damaged.

- Tighten screws on measuring chamber and base plate without tools, hand-tight.
- Do not use pointed or hard objects in the measuring chamber.

7.1. Visual Inspection

Check SMG200M for visible faults or damages. If the following damages are found, contact service:

- visible damage at the SMG200M,
- deep scratches or damage at the touch screen display,
- cracks or fissures in the filters,
- loose or defective hoses.

NOTICE!

Operating the device in a technically incorrect condition.

The device may be damaged.

- Disconnect the power plug.
- Put the device out of operation and secure against unintentional putting into service.
- Contact service.

7.2. Change the Filter Inlet

DANGER!

Hazardous voltages.

When removing covers, live parts may be exposed.

- Disconnect the power plug before maintenance.

NOTICE!

Damage to components and malfunction.

The device may be damaged.

- Tighten screws on measuring chamber and base plate without tools, hand-tight.
- Do not use pointed or hard objects in the measuring chamber.

To change the filter inlet in case of significant discoloration or at the latest after 1 month, follow the steps below:

1. Unscrew the transparent cap from the filter [10].
2. Check the transparent cap for cracks. In case of deep cracks, the tightness of the device cannot be ensured; replace the transparent cap.
3. Unscrew the stay with filter inlet.
4. Remove the filter inlet.
5. Screw in the new filter inlet with the stay so that the filter inlet can no longer be turned.
6. Check sealing ring for correct seating.
7. Screw transparent cap hand-tight.
8. Perform a leak test, see 7.4 Perform the Leak Test.

7.3. Empty the Condensate Trap with Collecting Container

DANGER!

Hazardous voltages.

When removing covers, live parts may be exposed.

- Disconnect the power plug before maintenance.

NOTICE!

Damage to components and malfunction.

The device may be damaged.

- Tighten screws on measuring chamber and base plate without tools, hand-tight.
- Do not use pointed or hard objects in the measuring chamber.

The fill level of the collecting container must not exceed the lower yellow ring. If there is too much water in the collecting container, it will be blocked and the measurement will return incorrect values.

To empty condensate trap with collecting container, follow the steps below:

1. Pull the condensate trap with collecting container [9] out of the holder.
2. Pull off both hoses.
3. Pull the upper insert out of the transparent trap.
4. Pour out the condensate.
5. Dry the condensate trap with a dry, lint-free cloth.
6. Check the condensate trap for visible contamination, if necessary clean with a dry, lint-free cloth.
7. Assemble the condensate trap.
8. Attach both hoses.
9. Insert the condensate trap on the back site, check the correct installation direction (arrows pointing upwards).
10. Perform a leak test, see 7.4 Perform the Leak Test.

7.4. Perform the Leak Test

DANGER!

Hazardous voltages.

When removing covers, live parts may be exposed.

- Disconnect the power plug before maintenance.

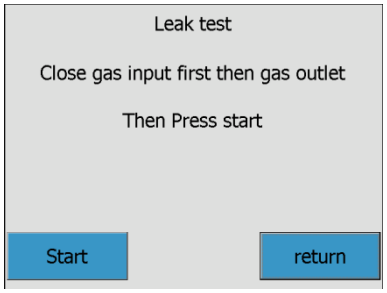
NOTICE!

Damage to components and malfunction.

The device may be damaged.

- Tighten screws on measuring chamber and base plate without tools, hand-tight.
- Do not use pointed or hard objects in the measuring chamber.

Perform the leak test regularly after every maintenance and after prolonged storage:



1. Click „Parameters“.
2. Click „Leak test“.
3. Follow the on-screen instructions.
   - ➢ Leak test is started.

If the leak test is unsuccessful:

1. Check external components for correct fit and cracks.
2. Ensure that the condensate drain tap is closed.
3. Perform the troubleshooting, see 9.8 Device is not tight.

If the leak test after troubleshooting is still unsuccessful, contact our service.

7.5. Replace the Fuses

DANGER!

Hazardous voltages.

When removing covers, live parts may be exposed.

- Disconnect the power plug before maintenance.

To replace the fuses, follow the steps below:

1. Open the fuse holder in the power port [15] by pushing down on the tab in the middle and pulling out the holder.
2. Pull defective fuses out of the holder.
3. Insert new fuses.
4. Insert the holder into the opening, making sure that the tab snaps into place.

7.6. Sensor Check and Calibration

The SMG200M is a sensitive optical measuring device. To ensure the precision of the measurements, the sensor must be checked once a year.

The sensor check serves to test the detectors and the analogue signal amplifiers of the SMG200M.

The sensor check can be performed by the operator or by our service.

7.6.1. Perform the Sensor Check

The sensor check requires the properly function of the SMG200M. If error messages are displayed, contact our service.

The sensor check is carried out with a check pen (order no.: 39783). It is not included in the scope of delivery.

NOTICE!

Malfunction of the check pen.

Measured values may be corrupted.

- The check pen must be serviced and checked once a year by our service.

1. Perform the weekly cleaning, see 8.2 Weekly Cleaning.
2. Click “Sensor Check” and follow the on-screen instructions.
   - ➢ The sensor check will be performed. If the sensor check is unsuccessful, recalibrate the SMG200M, see 7.6.2 Calibration.

Because the SMG200M is turned upside down during the sensor check, the display also turns automatically by 180°.

7.6.2. Calibration

Calibration must be performed by the manufacturer or certified service partners, contact our service.

8. Cleaning

8.1. Cleaning after a Measurement

DANGER!

Hazardous voltages.

When removing covers, live parts may be exposed.

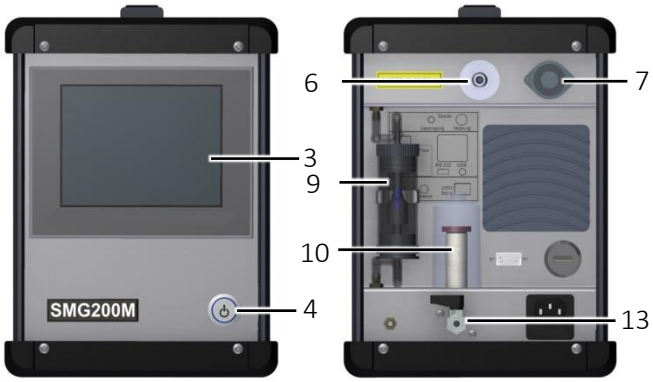
- Disconnect the power plug before cleaning.

NOTICE!

Damage to components and malfunction.

The device may be damaged.

- Do not use any liquids for cleaning.
- Do not use compressed air for cleaning inside the device.



1. Click „Turn Off“.
   - ➢ The process of turning off takes several minutes.
2. Pull out the power plug.
3. Clean the touch screen display [3] with a dry, soft cloth.
4. Check the condensate trap with collecting container [9].
5. Empty the collecting container [9].
6. Check the filter inlet [10] and replace if necessary.
7. Check the condensate collector [10] and empty it through the condensate drain tap [13] if necessary.
8. Disconnect the probe from device: press the button on the probe and pull out the probe.
9. Clean the probe with compressed air.

NOTICE!

Damage to the probe and malfunction.

The probe may be damaged.

- Do not use any liquids for cleaning.
- Clean probe and measuring head separately.
- Clean with max. 3000 hPa overpressure.
- Clean the extraction hose with a dry, lint-free cloth on the outside.

10. Attach measuring head to the probe.
11. Attach the probe to the gas input [6].
12. Attach the probe to the electrical probe port [7].
13. Attach the included power cable.
14. Press the power switch [4].
15. Perform a leak test, see 7.4 Perform the Leak Test.

8.2. Weekly Cleaning

DANGER!

Hazardous voltages.

When removing covers, live parts may be exposed.

- Disconnect the power plug before cleaning.

NOTICE!

Damage to components and malfunction.

The device may be damaged.

- Tighten screws on measuring chamber and base plate without tools, hand-tight.
- Do not use pointed or hard objects in the measuring chamber.

Use the supplied cleaning set for weekly cleaning.

The cleaning set can be reordered.

To perform the weekly cleaning, follow the steps below:

1. Perform the cleaning after a measurement, see 8.1 Cleaning after a Measurement.
2. Change the filter inlet [10] if necessary, see 7.2 Change the Filter Inlet.
3. Turn the SMG200M over so that the bottom plate points upwards.
4. Unscrew two knurled nuts without tools.
5. Open the bottom plate.
6. Unscrew two screws of measuring chamber without tools.
7. Carefully remove the measuring chamber cover and set it down securely.
8. Clean the gas input [6] with the cleaning brush.
9. Clean the gas opening in the middle of the measuring chamber with the cleaning brush.
10. Clean the inside of the measuring chamber and the measuring chamber cover with the cleaning cloth.
11. Put on the measuring chamber cover.
12. Screw in two screws of measuring chamber hand-tight without tools.
13. Put on the bottom plate.
14. Screw in two knurled nuts hand-tight without tools.
15. Perform a leak test, see 7.4 Perform the Leak Test.

9. Troubleshooting

The points described here serve to eliminate faults and cannot represent all fault causes. If the faults are not remedied despite the measures taken or if faults occur other than those described here, contact our service:

Telephone: +49 340 5510 214

E-mail: service@saxon-junkalor.de

9.1. Device does not work

Error	Possible cause	Instructions/Repair
empty screen	none or wrong power	check power cord and power supply
	fuse defect	replace fuse
	device error	contact service
blurry or faulty screen	initialisation error	turn off device, turn on after 1 minute
	update error	repeat update with current software package
	electronics error	contact service

9.2. Error Message

Error	Possible cause	Instructions/Repair
… don't work with firmware …	software and optic firmware incompatible	update of a recommended combination
bottom panel open	bottom panel not fixed or in wrong position	check the bottom panel for correct and stable position
temperature error	operation temperature of a component too low	wait 10 min; if the error still exists, contact service
overtemperature	a heater is too hot, the device turns off all heaters	turn off the SMG200M immediately and turn on after 20 min; if the error returns, contact service
pump error	pump or pump electronics defect	contact service
measured values not plausible	device polluted	clean the SMG200M (see 8. Cleaning)
other error	error in electronics	contact service

9.3. Error at the Sensor Check

Error	Possible cause	Instructions/Repair
sensor check not successful	device polluted	clean the SMG200M (see 8. Cleaning) and repeat the sensor check
	device messages an error	check, contact service

9.4. RS232 – Error at Data transfer

Error	Possible cause	Instructions/Repair
no data	cable error	use a standard RS232 zero-modem cable
	wrong protocol	apply following parameters: 115200 bps, 8 Bit, 1 stop bit, no parity, no hardware protocol
data wrong or special signs	protocol error	apply following parameters: 115200 bps, 8 Bit, 1 stop bit, no parity, no hardware protocol

9.5. Wireless Communication

Error	Possible cause	Instructions/Repair
link not possible	wrong device	check for the correct SMG200M
	out of range	ensure that the outstation also works according to IEEE 802.15.1 class 1

9.6. Flow Error

Error	Possible cause	Instructions/Repair
flow to high	flow not yet regulated	flow needs about 1 min to regulate
flow to low	any closure in gas flow	check and clean the probe
	pump error	contact service

9.7. Mechanical Error

Error	Possible cause	Instructions/Repair
probe plug don't lock	easy lock polluted	clean it and put a drop sewing machine oil on it

9.8. Device is not tight

Error	Possible cause	Instructions/Repair
leak test not successful	gas input / probe head or gas outlet not closed	ensure that input and outlet are closed
	open hose connection	check all visible hoses
	water trap defect	check the water trap for cracks
	filter cap defect	check the filter cap for cracks
	seal ring under filter cap defect or missing	check the seal ring
	condensate tap open	close the condensate tap
	chamber cover not tight	check the chamber cover and the seal ring
	unknown	contact service

9.9. Zero Point Error

Error	Possible cause	Instructions/Repair
error in comparison with manufacturers zero point	zero point filter defect	change zero point filter
	device error	contact service

10.Warranty and Guarantee

In addition to the statutory warranty, we provide a voluntary guarantee of 12 months from the date of invoice for the proper functioning of the device. Excluded from the warranty are all wearing parts such as filters and filter inlets.

Guarantee claims are only accepted, if SAXON Junkalor GmbH gives a guarantee with registration number, and this number is accounted.

The warranty covers the free repair of the device by SAXON Junkalor GmbH.

Warranty claims are only accepted after online registration in our service centre www.saxon-junkalor.de.

Repair services are guaranteed for 6 months. This applies only for the errors specified by customer and repaired by SAXON Junkalor GmbH. If device or components fail during this time with another error, it is not in the given guarantee.

Unauthorized interventions and destruction of the safety measures on the device invalidate any warranty.

11.Reshipment and Packaging

Ship the SMG200M in its original packaging or in suitable and secure packaging. Make sure that free areas in the shipping box are designed with shock-absorbing material. Enclose a filled contamination declaration to your return. Note that the device will not be accepted without a filled declaration of contamination.

Contamination declaration can be found in Annex III – Contamination Declaration or on:
http://www.saxon-junkalor.de/cms/wp-content/uploads/2016/03/Kontaminationserklaerung.pdf

IMPORTANT

The device will not be accepted without a filled declaration of contamination.

- Enclose the completed declaration of contamination when return.
- For contamination declaration see Annex III – Contamination Declaration

12.Decommissioning and Disposal

Turn off the supply voltage and disconnect the power plug.

IMPORTANT

The device is not to be disposed of as household waste.
The local and currently valid legislation must be observed.

The device is made of materials that can be recycled. The components are easily separable.

If you have no opportunity to dispose of the old device professionally, contact our service. It agrees with you a redemption and disposal by SAXON Junkalor GmbH.

13.Accessories and Spare Parts

Accessories	Art. No.
Sampling Hose, QL, heated, 2 m (6ft)	40075
Sampling Hose, QL, heated, 3 m (9ft)	40104
Sampling Probe Head 300/50, QL, with Cone	40082
Sampling Probe Head 600/50, QL, with Cone	40083
Sampling Probe Head 1000/50, QL, with Cone	40084
Sampling Probe Head 400, QL, flexible, with Handle	40085
Sampling Probe Head 280, QL, flexible, with Handle	40086
Cleaning kit for dust measuring device	39309
Checkpen V2 for check of sensor parameters	39783
Bluetooth (IEEE 802.15.1) USB Stick for PC, Class 1	36325
PC Software „Terminal Dust“	39531

Spare Parts	Art. No.
Zero point Filter MF	38549
Filter MF for Condensate Separator Type C	38723
Stay for Condensate Separator Type C	38739
Condensate Vessel Type C with sealing Ring	38741
Sealing Ring for Condensate Vessel Type A/C	32071
Water Trap, complete	39277
Side Panel (2 pcs)	40120
Bottom Panel SMG	38581
Lock Nut for bottom Panel (2pcs)	38932
Case Protectors (2 pcs)	38548
Gas Drain Hose 5 m, DN6/8 PVC	40066
Fuse T2L250V, 10 pcs	39035
Sealing Ring for QL connector, (10 pcs)	40132

Annex I – EU-Certificate of Conformity

As defined by EU directives:

- 2014/30/EU (EC Directive for Electromagnetic Compatibility, EMC)
- 2014/35/EU (EC Low-Voltage Directive, LVD)
- 2014/53/EU (Radio Equipment Device, RED)
- 2011/65/EU (Restriction of Hazardous Substances Directive, RoHS)

Applied harmonized standards:

- EN 61326-1:2013 (EMC)
- EN 61010-2-081:2002+A1:2003; EN 61010-1:2010 (NSR)

Hereby SAXON Junkalor GmbH declares that the instrument described in this document is in compliance with the essential requirements and other relevant provisions of the above-mentioned guidelines. The complete EU Declaration of Conformity can be found on www.saxon-junkalor.de.

Annex II – Communication (Option)

After enabling the communication function on the SMG200M, you can communicate with the SMG200M via the RS-232 interface or wirelessly according to IEEE 802.15.1. The protocol structure and the commands are documented below.

1. Connection

1. Cable connection via RS-232 connection: this requires a crossed 9-pin data cable (null modem cable) male to female connector.
2. Bluetooth® connection, the password for the wireless connection is: 5510344

2. Communication Protocol

To link with the SMG200M following parameters are valid:

115200 bps, 8 bit, 1 stop bit, no parity

There is no hardware supported flow control.

The data packages have following structure:

STX Command Status Data Checksum ETX

STX	0x02
Command	2 bytes ASCII (from 1 byte CMD)
Status	2 bytes (see table)
Data	variable ASCII
Checksum	1 bytes EXOR over all data ahead the checksum, changed to 2 bytes ASCII
ETX	0x03

Example for the calculation of the Checksum:

transmitted: 02H 30H 31H 30H 30H ...

checksum: XOR (02H^30H^31H^30H^30H) = 03H

additional transmitted: 30H 33H 03H (incl. ETX)

In the case of letters upper cases are sent.

Example:

Start of continuous data transmission (command 58)

PC -> SMG200M:	STX	Command	Status	Data	Checksum	ETX
	02H	35H 38H	30H 30H	-------	30H 46H	03H
SMG200M -> PC:	STX	Command	Status	Data	Checksum	ETX
	02H	35H 38H	60H 70H	-------	31H 46H	03H

The form of the answer block correlates to the command block with the correct status and a different count of data bytes.

As support you find a script with all commands for use with the terminal program HTerm at the USB flash drive.

Status Byte

Status Byte 1	
Bit	Meaning
0	measurement finished
1	sensor check is running
2	measuring range overflow
3	-------
4	-------
5	error cat 2 (temperatures)
6	error cat 3 (flow, pump error)

Status Byte 0	
Bit	Meaning
0	standby
1	ready for measurement
2	bottom panel is open
3	zero-point drawing is running
4	new measure values available (internal command)
5	warm-up is running
6	measurement is running

3. Set of Commands

05 Current Measured Value

	CMD	Status	Data
from PC	05H	00H	-----
Answer	05H	Status	Format: %8.1f, 8 bytes, one decimal place

06 Measured Values after the End of Measurement

	CMD	Status	Data
from PC	06H	00H	-----
Answer	06H	Status	3 values (mean, minimum, maximum), each %8.1f, 8 bytes, one decimal place

22 Request Preset Measure Time

This command triggers a zero point. Make sure that the device is in clean environment air.

	CMD	Status	Data
from PC	22H	00H	-----
Answer	22H	Status	%d, measure time in 100 ms

51 Request Content of Data Sets in Data Logger (not available during measurement)

	CMD	Status	Data
from PC	51H	00H	-----
Answer	51H	Status	see below

Answer Data:

Header (1x):

02	*3531*	*6131*
STX	51	A1
STX	CMD	STAT

Data Row (one every Measurement):

3030 3B 2032303137 3031 3039 5F 3038 3236 3135 5F 3130 23

00	;	2017	01	09	_	08	26	15	_	10	#
No.	;	Date			_	Time				_Particle#	

Tail (1x)

3239	*03*
Checksum	ETX

52 Transmit Selected Data Sets (not available during measurement)

(see Annex II „(A) Measurement data of the last measurement“)

	CMD	Status	Data
from PC	52H	00H	je %02d for every required data set
			(e.g. 30H30H 30H32H for data sets 0 & 2)
Answer	all selected data sets, separator „EEEEEEEEE“ (w/o protocol)		

58 Send Data Continuously (every time interval)

	CMD	Status	Data
from PC	58H	00H	-----
Answer	58H	Status	-----

After this command the dust measuring device sends during a measurement every time interval the current particle mass concentration. The transmission is terminated with the command 59.

Example of a Data Transfer:

02	*3538*	*4131*	*20202020322E3839*	*3032*	*03*
02	58	A1	00002.89	02	03
STX	CMD	STAT	Measured Value	Checksum	ETX

59 Stop Continuous Data Transmission

	CMD	Status	Data
from PC	59H	00H	-----
Answer	59H	Status	-----

68 Version and Serial Number

	CMD	Status	Data
from PC	68H	00H	-----
Answer	68H	Status	Serial Number
			„ / „ (slash)
			Device Type
			„ „ (space)
			Program Version (Versions Date)
			„ / „ (slash)
			Type of Optic
			„ „ (space)
			Optic Version (Versions Date)

69 Status of Heaters

	CMD	Status	Data
from PC	69H	00H	-----
Answer	69H	Status	2 bytes Heater Status (one byte ASCII)
			Bit 0 probe heater
			Bit 1 Gas Input
			Bit 2 Chamber
			(if set: nominal temperature reached)

79 Particle Type

	CMD	Status	Data
from PC	79H	00H	-----
Answer	79H	Status	2 bytes kind of particle, 3-4 bytes measure time in s

table of particles (depending on implementation):

Code	particle type
08	dioctyl sebacate
09	diesel combustion exhausts
10 („31 30“)	Calcilin
11 - 14	customer specific calibration

An external selection of the particle type is not possible.

80 Start Measurement

	CMD	Status	Data
from PC	80H	00H	-----
Answer	80H	Status	“1” started
			“0” start was not successful

81 Stop Measurement / Return to Main Menu

	CMD	Status	Data
from PC	80H	00H	-----
Answer	80H	Status	“1” measurement finished / returned to main menu
			“0” finish/return was not successful

(A) Measurement data of the last measurement

The measured data of the last measurement (command 52) consist of a header, the measured data and a tail.

Header

Row 1

HD;SMG200M;480/0035;

HD	Header Identifier
SMG200M	Device Type
480/0035	Serial Number

Row 2

PA;2017/02/15;14:23:55;1800;10;

PA	Identifier for Parameters
2017/02/15	Date of Measurement
14:23:55	Start Time of Measurement
1800	nominal Duration of Measurement
10	Particle Type

Row 3

CT;date;time;m;Tgh;Tmk;Teh;Tso;Flow;Q;35H;90H;120H;35L;90L;120L;STBW90;

This text row describes the content of the data columns.

Measured Data Rows

The data row may contain a zero-point or a measured value. The structure of both rows is identical.

ZP;2017/02/15;14:23:55;2.12; 0.11;36.3;48.0;100.1;100.0;3.07;

ZP or VL	identifier zero-point row / measure value row
2017/02/15	date of zero-point / measured value
14:23:55	time of zero-point / measured value
2.12	measured value (invalid value at zero-point)
0.11	standard deviation since the last measured value
36.3	inside temperature of housing in °C
49.9	temperature of measure chamber in °C
100.1	temperature of internal gas input heater in °C
100.0	temperature of probe heater in °C
2.87	flow in Nl/min

If the measurement is done without an current zero point, the date and time of ZP row is different to the date and time of measured values.

Tail

VF;4.55;2.71;8.33;0.1103;

VF	identifier last row
4.55	mean value
2.71	minimum value
8.33	maximum value
0.1103	standard deviation over all measured data

Request of more than one Measurement

Calling more than one data set all data sets will transmitted at once. At the end of every data set there is a separator „EEEEEEEEEEEEEEEEEEE".

Annex III – Contamination Declaration

Kontaminationserklärung

Empfänger der Rücksendung:

SAXON Junkalor GmbH
Abteilung Service
Alte Landebahn 29
D-06847 Dessau-Roßlau

Tel.: 0340 5510 214
Fax: 0340 5510 201
E-Mail: junkalor@saxon.de

Erklärung der Gefahrenfreiheit

Zum Schutz der Umwelt und unseres Personals können wir als Empfänger zurückgesendete Geräte und Baugruppen nur dann transportieren, prüfen, reparieren oder entsorgen, wenn das ohne Risiken für Personal und Umwelt möglich ist.
Ohne Kontaminationserklärung können wir Ihre Rücksendung leider nicht bearbeiten.
Wir danken für Ihr Verständnis.

Eingesendetes Produkt :_____

Werk.-Nr. :_____

Grund der Einsendung :_____

Verwendetes Medium :_____

Einsatzbedingte Kontaminierung des Produktes:

Toxisch	☐ Nein	☐ Ja
Ätzend	☐ Nein	☐ Ja
Explosiv	☐ Nein	☐ Ja
Biologisch	☐ Nein	☐ Ja
Radioaktiv	☐ Nein	☐ Ja
Sonstige Schadstoffe		
_____	☐ Nein	☐ Ja

Das Produkt ist frei von Gefahrstoffen

Das Produkt ist nicht frei von Gefahrstoffen und muss Dekontaminiert werden. Kontaminierte Produkte werden nur nach vorschriftsmäßiger Dekontaminierung angenommen. Bitte Nachweis beifügen.

Rechtsverbindliche Erklärung: Hiermit versichern wir, dass die Angaben korrekt und vollständig gemacht wurden und eventuelle Folgekosten akzeptieren. Der Versand des Produktes erfüllt die gesetzlichen Bestimmungen.

Firma: _____

Abteilung_____ Name: _____

Straße: _____ PLZ, Ort: _____

Tel.-Nr.: _____ E-Mail: _____

Datum, Unterschrift: _____

SAXON Junkalor GmbH	D-06846 Dessau-Roßlau	Ausgabe 1