

Schambeck SFD GmbH

S3210 UV/Vis Detector

User Manual

Version 2.0

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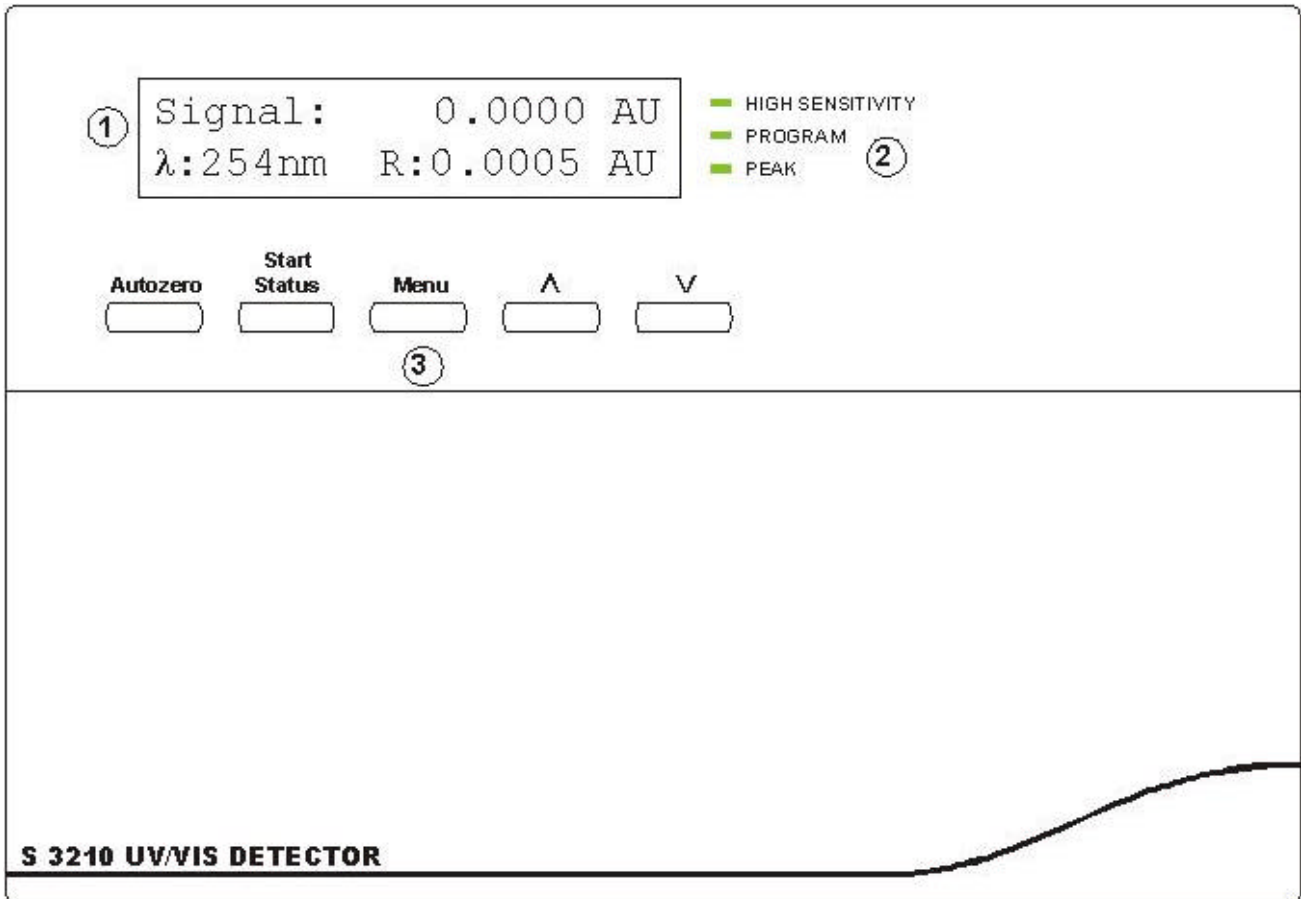
1. TECHNICAL SPECIFICATIONS

1. TECHNICAL SPECIFICATIONS

Wavelength:	Deuterium/Tungsten Lamp 190 to 720 nm
Bandwidth:	6 nm
Range:	2.0; 1.0; 0.5; 0.25; 0.1; 0.05; 0.01; 0.005; 0.001; 0.0005 AU
Analog Output:	0 - 2 V; Range at 1 V.
External:	
Input	Start; Stop; Autozero
Output	Error; Peak; Valve
RS232:	ASCII Commands
Noise:	< 3.0×10^{-5} AU at 254nm after warm-up
Drift:	< 5.0×10^{-5} AU/hour
Display:	2 x 20-character LCD
Dimensions:	35,5 cm x 22,5 cm x 16 cm (L x W x H)
Weight:	8,9 kg
Power Supply:	~220 V; 50 Hz

2. OVERVIEW

2. OVERVIEW



2.1 FRONT

Picture 1: The Front

1. 2 x 20-character LCD Display
2. Status LEDs
3. Keyboard

2.1.1 Status LEDs

On the right of the LCD are 3 LEDs, which indicate different information:

HIGH SENSITIVITY

This LED is on, if the detector is running in <HIGH SENSITIVITY> mode. In <HIGH RESOLUTION> mode the LED is off.

2. OVERVIEW

PROGRAM

This LED indicates if a program is currently running. This can be either a time or a scan program.

PEAK

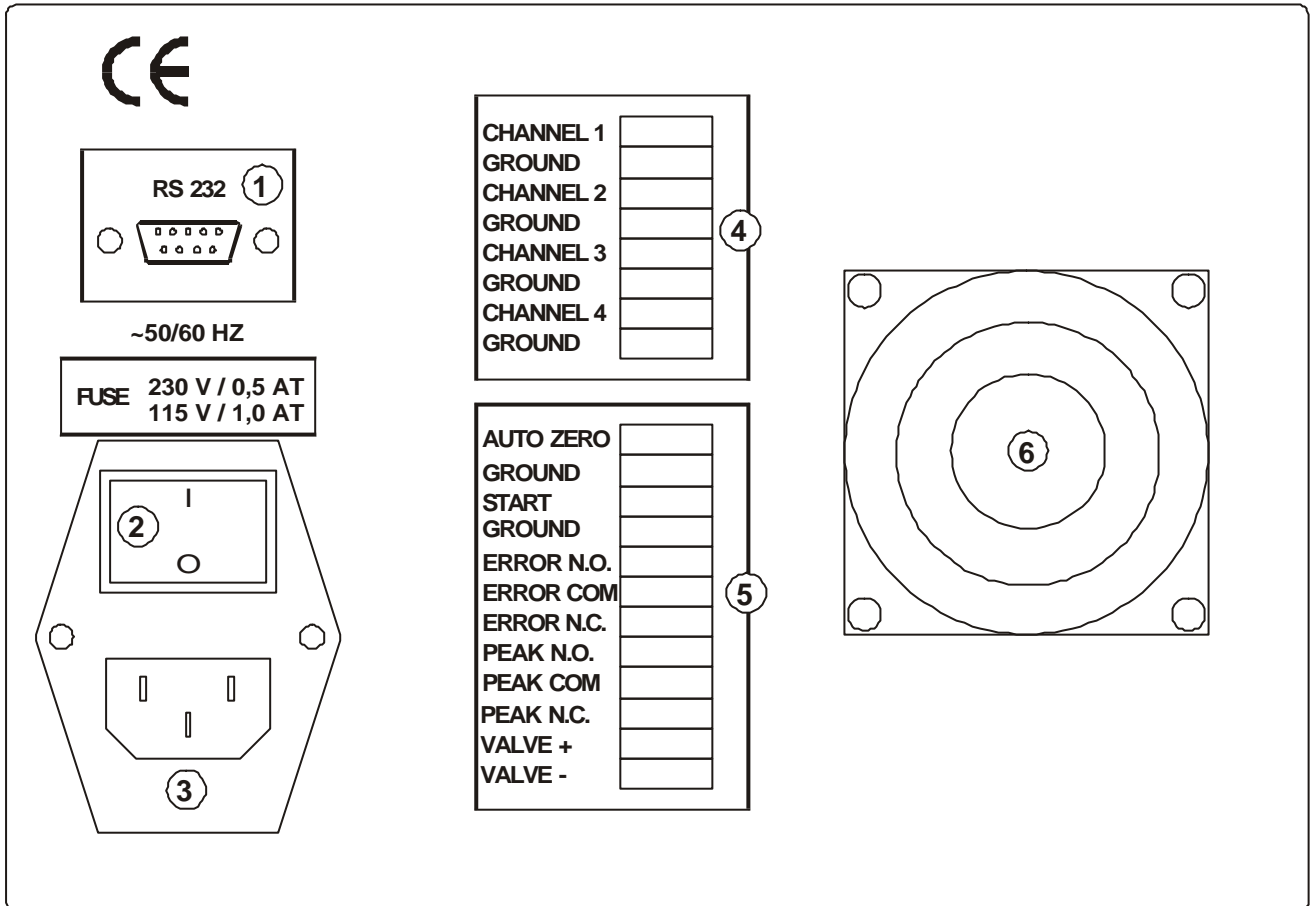
This LED is on if the detector has detected a peak.

2.1.2 Keyboard

Autozero	Reset the baseline
Start/Status	Start of a program or return to the status display if a menu is currently shown. You will find further information at "3. The Functions of the S3210".
Menu	Show / select the menus.
Up	Increase or change a value in the menu.
Down	Decrease or change a value in the menu.

2. OVERVIEW

2.2 THE BACK



Picture 2: The Back

1. RS 232 Connector
2. Power Switch
3. Power Supply
4. Analog Outputs
Only Channel 1 is connected !
5. External Input & Output
6. Ventilator

2.2.1 Analog Output

CHANNEL 1-4

These are the analog outputs of Channel 1 to 4. Only Channel 1 has any function with the S3210.

2. OVERVIEW

2.2.2 External Input & Output

AUTO ZERO

Reset the baseline with an external signal.

START

Start the time program with an external signal.

ERROR

In case of an error a signal is put out here.

PEAK

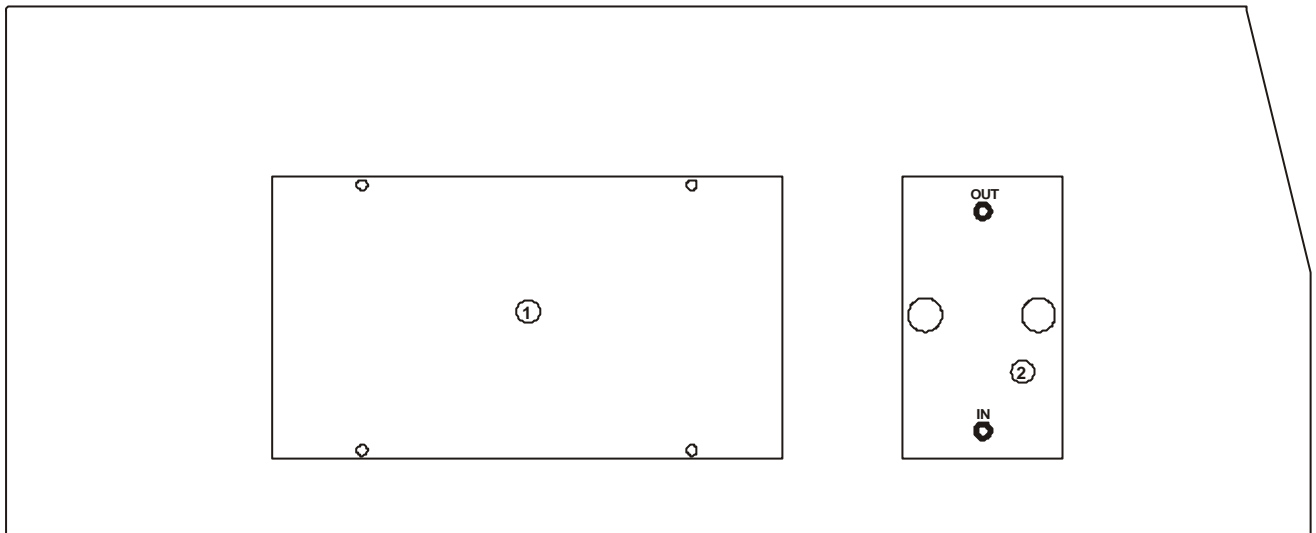
A signal is put out here if the detector has detected a peak. Please refer to "3.4 The Peak Detector" for further information.

VALVE

This signal is used for switching the external valve of the sample collector/eluent saver. Please refer to "3.4 The Peak Detector" for further information.

2. OVERVIEW

2.3 THE SIDE



Picture 3: The Side

- | |
|---|
| <ol style="list-style-type: none">1. Access to Deuterium & Tungsten lamps2. Flowcell |
|---|

2.3.1 Lamp Access

By detaching the 4 screws you have access to the Deuterium and Tungsten lamps for easy changing.

2.3.2 The Flowcell

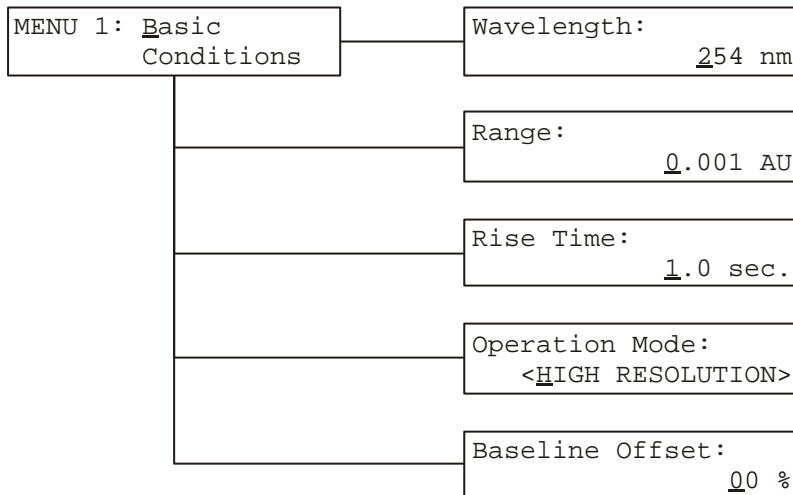
The Flowcell can be removed by detaching the 2 screws.

ATTENTION:	Do not touch the small window of the flowcell. The acid on the skin leads to inaccurate results and can damage the flowcell!
-------------------	---

2. OVERVIEW

2.4 THE MENUES

2.4.1 Menu 1: Basic Conditions



Picture 4: Menu 1 Diagram

In Menu 1 you find all basic conditions for the normal operation.

Wavelength

Here you can change the wavelength. The possible values lie between 190 to 720 nm.

Use the **UP** and **DOWN** keys to change the current value.

Range

Here you can change the range. The possible values are: <2.0>, <1.0>, <0.5>, <0.01>, <0.005>, <0.001> and <0.0005> AU.

Use the **UP** and **DOWN** keys to change the current value.

Rise Time

Here you can change the Rise Time. The possible values are: <5.0>, <2.0>, <1.0>, <0.5>, <0.2> and <0.1> seconds.

Use the **UP** and **DOWN** keys to change the current value.

Operation Mode

You can choose between <HIGH SENSITIVITY> and <HIGH RESOLUTION>. <HIGH RESOLUTION> is the default mode. If you want to increase the sensitivity change the mode to <HIGH SENSITIVITY>.

Use the **SELECT** key to change the current value.

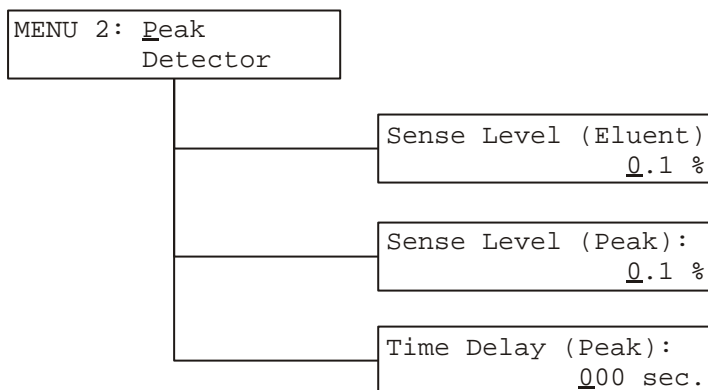
2. OVERVIEW

Baseline Offset

With the Baseline Offset you can change the baseline of the analog output. The values lie between 0 and 20% of the selected range.

Use the **UP** and **DOWN** keys to change the current value.

2.4.2 Menu 2: Peak Detector



Picture 5: Menu 2 Diagram

In Menu 2 you find all parameters of the Peak Detector / Eluent Saver. Please refer to "3.4 The Peak Detector" for further information.

Sense Level (Eluent)

Here you can change the Sense Level of the Eluent Saver. Possible values lie between 0.1 and 9.9 % of the selected Range.

Use the **UP** and **DOWN** keys to change the current value.

Sense Level (Peak)

Here you can change the Sense Level of the Peak Detector. Possible values lie between 0.1 and 9.9 % of the selected Range.

Use the **UP** and **DOWN** keys to change the current value.

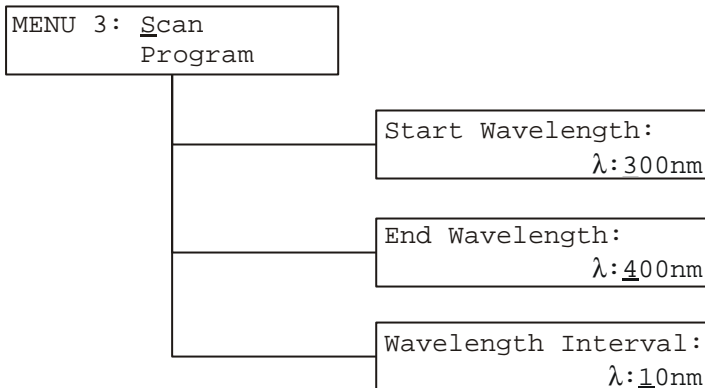
Time Delay (Peak)

Here you can specify a Time Delay from 0 to 999 seconds.

Use the **UP** and **DOWN** keys to change the current value.

2. OVERVIEW

2.4.3 Menu 3: Scan Program



Picture 6: Menu 3 Diagram

In Menu 3 you can change the parameters of the Scan Program. Please refer to "3.3 The Scan Program" for further information.

NOTE: The Scan function is optional.

Start Wavelength

Here you can change the start of the wavelength range you want to scan. The possible values lie between 190 and 720 nm. The value cannot be higher than the chosen End Wavelength !

Use the **UP** and **DOWN** keys to change the current value.

End Wavelength

Here you can change the end of the wavelength range you want to scan. The possible values lie between 190 and 720 nm. The value cannot be smaller than the chosen Start Wavelength!

Use the **UP** and **DOWN** keys to change the current value.

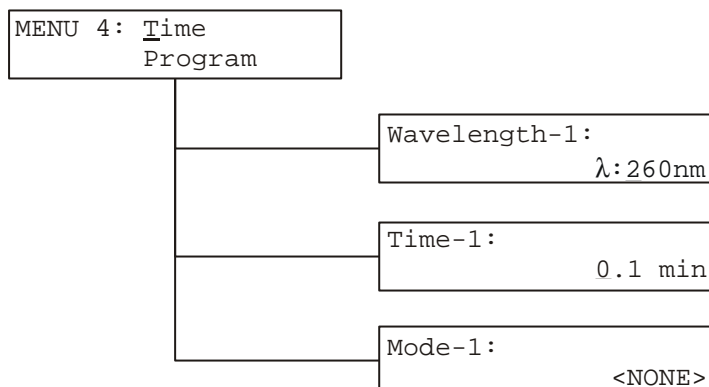
Wavelength Interval

Here you can change the Interval of the Scan. Possible values lie between 2 and 50 nm.

Use the **UP** and **DOWN** keys to change the current value.

2. OVERVIEW

2.4.4 Menu 4: Time Program



Picture 7: Menu 4 Diagram

In Menu 4 you change all parameters of the Time Program. Please refer to "3.2. The Time Program" for further information.

The Time Program has up to 10 steps which can be changed individually. The following description is valid for each of these steps n (1-10).

Wavelength- n

Here you specify the new wavelength. The possible values lies between 190 and 720 nm.

Use the **UP** and **DOWN** keys to change the current value.

Time- n

Specify how long this step should be running before switching to the next step. The value is absolute in regard to the program start. Possible values lie between 0.1 and 99.9 minutes.

Use the **UP** and **DOWN** keys to change the current value.

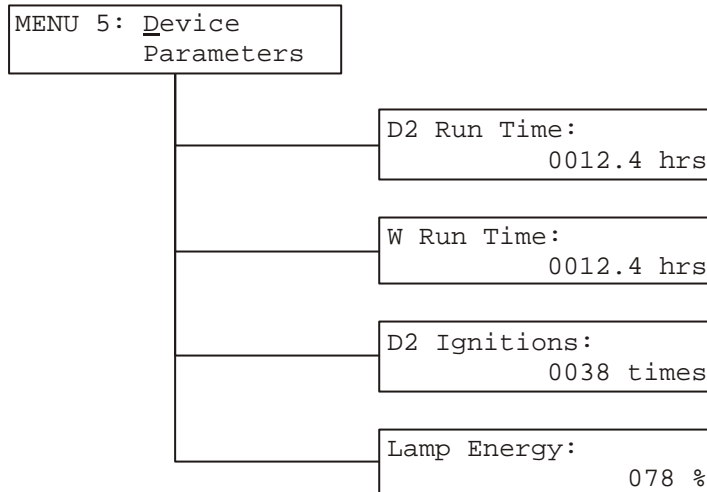
Mode- n

Here you can specify what should be done with the Signal after changing to this step. The possible values are: <NONE>, <AUTOZERO> and <HOLD>.

Use the **UP** and **DOWN** keys to change the current value.

2. OVERVIEW

2.4.5 Menu 5: Device Parameters



Picture 8: Menu 5 Diagram

Here you find the statistics of the device. All values are for information only. They can not be changed.

D2 Run Time

Here you see the run time of the Deuterium lamp.

NOTE: The lamp should be exchanged after 2000 hours of use. A warning message is displayed if the 2000 hours are reached.

W Run Time

Here you see the Tungsten lamp run time.

D2 Ignitions

Here you see the times of lamp ignitions of the Deuterium lamp.

Lamp Energy

Here you see the current energy level of the lamps.

3. THE FUNCTIONS OF THE S3210

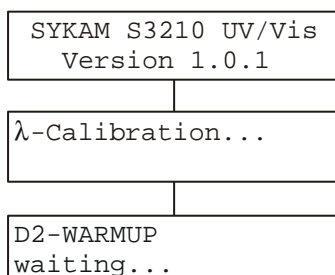
3. THE FUNCTIONS OF THE S3210

3.1 BASIC OPERATION

3.1.1 Setup

- Connect the S3210 to the power supply with the delivered cable.
- Make sure that the flowcell is fastened.
- Connect the Detector's CHANNEL 1 / GROUND connectors to an Integrator or datasystem.
- If you want to use the Peak Detector / Eluent Saver connect the external outputs VALVLE & PEAK.
- Turn on the device.

3.1.2 The Initialization

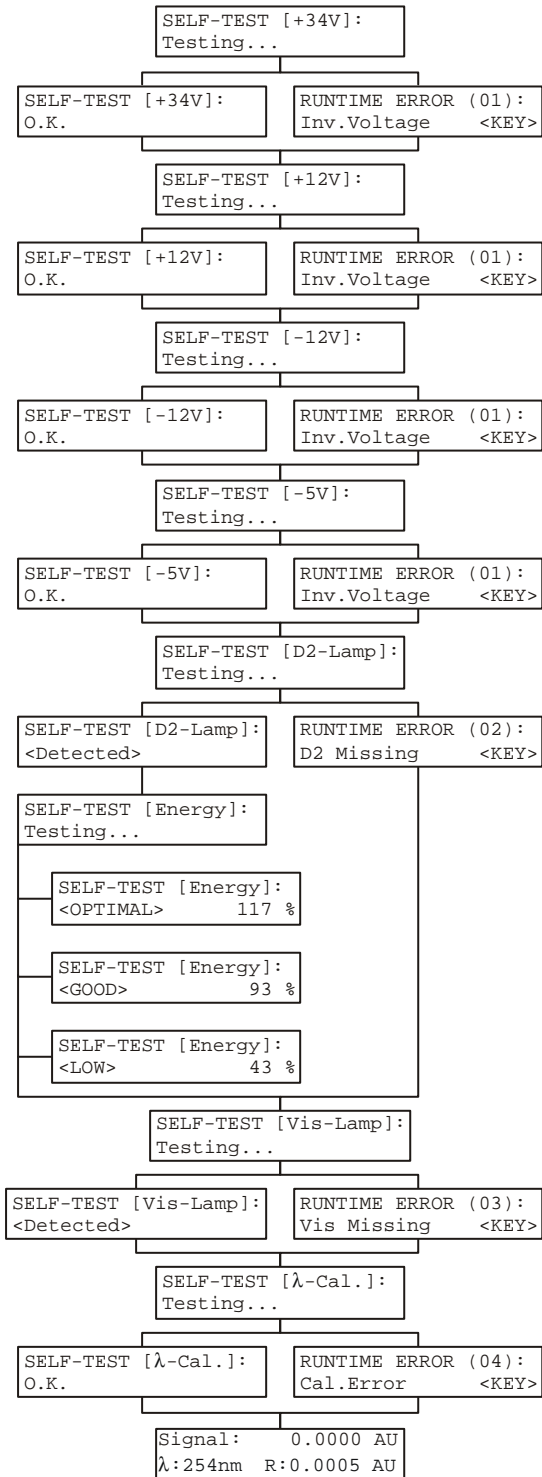


Picture 9: Initialization Sequence

After you turned on the device a initialization sequence is started. During this sequence the Deuterium and Tungsten lamps are turned on and the diodes of the optical array are assigned to its respective wavelengths. In case of an defective lamp an error message is shown on the display.

3. THE FUNCTIONS OF THE S3210

3.1.3 The Self-Test



Picture 10: Self-Test Diagram

3. THE FUNCTIONS OF THE S3210

After the initialization sequence the self-test is run. This test checks several internal voltages and the Deuterium and Tungsten lamp. An error is indicated with a display message and a audio signal. The message can be deleted by pressing any key.

3.1.4 The Status Display

```
Signal:      0.0000 AU
λ:254nm  R:0.0005 AU
```

Picture 11: The Status Display

After the self-test the Status screen is displayed. If you are currently displaying a menu you can return to the Status Display by pressing the **START/STATUS** key.

On the Status Display you can see the current Signal in absorbance units (AU) and the currently selected wavelength and range.

3.1.5 Autozero

With the **AUTOZERO** key you can reset the baseline to 0.

3.1.6 The Menu

With the **MENU** key you activate the menu screen. There you can change the menus with the **UP** and **DOWN** keys. To select a specific menu press the **MENU** key again. The **ME-NU** key is also used to switch through all submenus.

3.2 THE TIME PROGRAM

The S3210 Detector has a Time Program function with which you can change the wavelength at specific times. The Program has up to 10 steps which can be changed individually. Each step is defined by the following parameters:

Wavelength-*n*

This is the new wavelength, which is selected at this step. As soon as this step is reached the wavelength changes to this value.

Time-*n*

This is the time for how long this steps should be running before switching to the next step. The parameters is absolute to the beginning of the program.

Mode-*n*

With each step you can select a mode of how the signal should be processed.

- **NONE** No change
- **AUTOZERO** The baseline is reset to 0.
- **HOLD** The baseline of the last step will be used as new baseline.

3. THE FUNCTIONS OF THE S3210

3.2.1 Start the Time Program

To start the Time Program press the **START/STATUS** key. In the program menu select the <TIME PROGRAM> by using the **UP** and **DOWN** keys. Confirm your selection by pressing the **START/STATUS** key again. The Status Display is shown and the program is started.

3.2.2 Stop the Time Program

If you want to stop the time program press the **START/STATUS** key and the program is immediately stopped.

3.3 THE SCAN PROGRAM [OPTIONAL]

With the Scan Program you have the possibility to scan a whole range of wavelengths and save this data for a later replay. The Scan Program is defined by the following parameters:

Start Wavelength

This is the start of the wavelength range you want to scan.

End Wavelength

This is the end of the wavelength range you want to scan.

Scan Interval

The Interval is size of the steps in which the whole range is scanned. The greater the Interval the smaller the amount of scanned data points and vice versa.

Example:

Start Wavelength:	300nm
End Wavelength:	450 nm
Scan Interval:	5 nm

→ Wavelength Range = 450 nm - 300 nm = 150 nm
→ Data Points = 150 nm / 5 nm = 30 Data Points

3.3.1 Start the Scan Program (Store)

To start the Scan Program press the **START/STATUS** key. In the program menu select the <SCAN-*n*> by using the **UP** and **DOWN** keys. The Parameter *n* is the ID of the scan. You can save up to 10 different scans (*n*=1 to 10). Confirm your selection by pressing the **START/STATUS** key again. Then you are asked if you want to store this scan or to replay it. Select <STORE> and confirm with the **START/STATUS** key.

The Status Display is shown and the program is started.

3. THE FUNCTIONS OF THE S3210

3.3.2 Replay the Stored Data (Replay)

To replay a stored scan follow the instructions above but select <REPLAY> instead of <STORE>. After confirmation a have to enter a <REPLAY RATE>. This is how many Intervals (see above) are shown each second.

During the replay all data points are shown on the screen and at the end the maximum signal is shown with is corresponding wavelength.

NOTE: **During the replay no new data can be read ! Do not replay a scan while doing an analysis !**

3.4 THE PEAKDETECTOR

The S3210 has a function to save not only the sample but also the eluent. This is done with the **Peak Detector**.

This function is defined by the following parameters:

Sense Level (Eluent)

This value defines the level up to which Signal height an eluent should be saved. The value is a percentage value of the selected range. While below this level the external valve is turned to the eluent saver.

Sense Level (Peak)

This value defines the level at which Signal height a sample should be saved. The value is a percentage value of the selected range. While above this level the external valve is turned to the sample saver.

Time Delay (Peak)

Use the time delay for the length a sample needs from the detector to the sample saver.

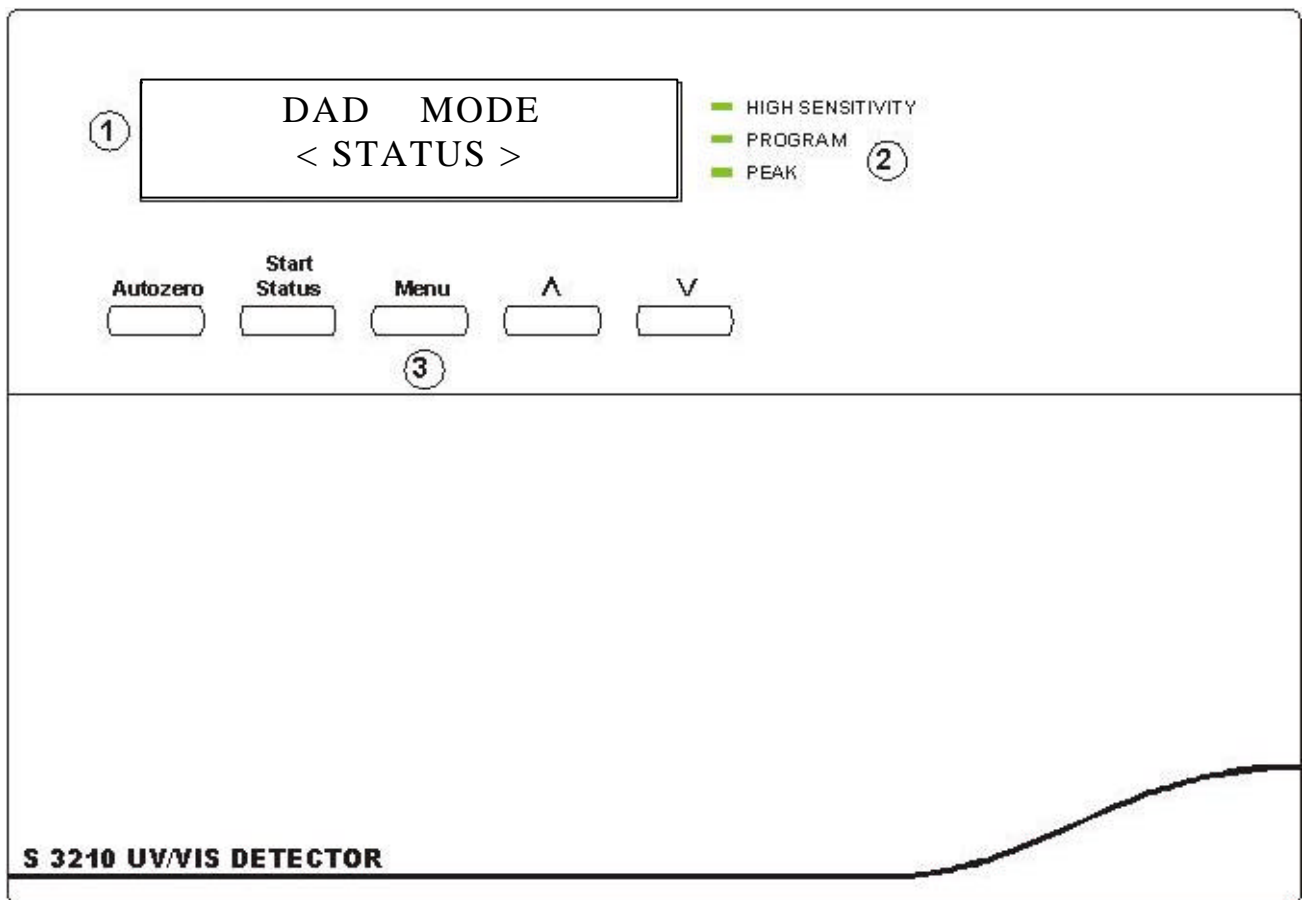
3. THE FUNCTIONS OF THE S3210

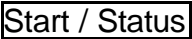
3.5 THE DAD MODE

The DAD - Modus only works if you have the internal DAD Software for the UV/VIS S3210.

To select the DAD – Modus press the buttons   at the same time.

The display is change to



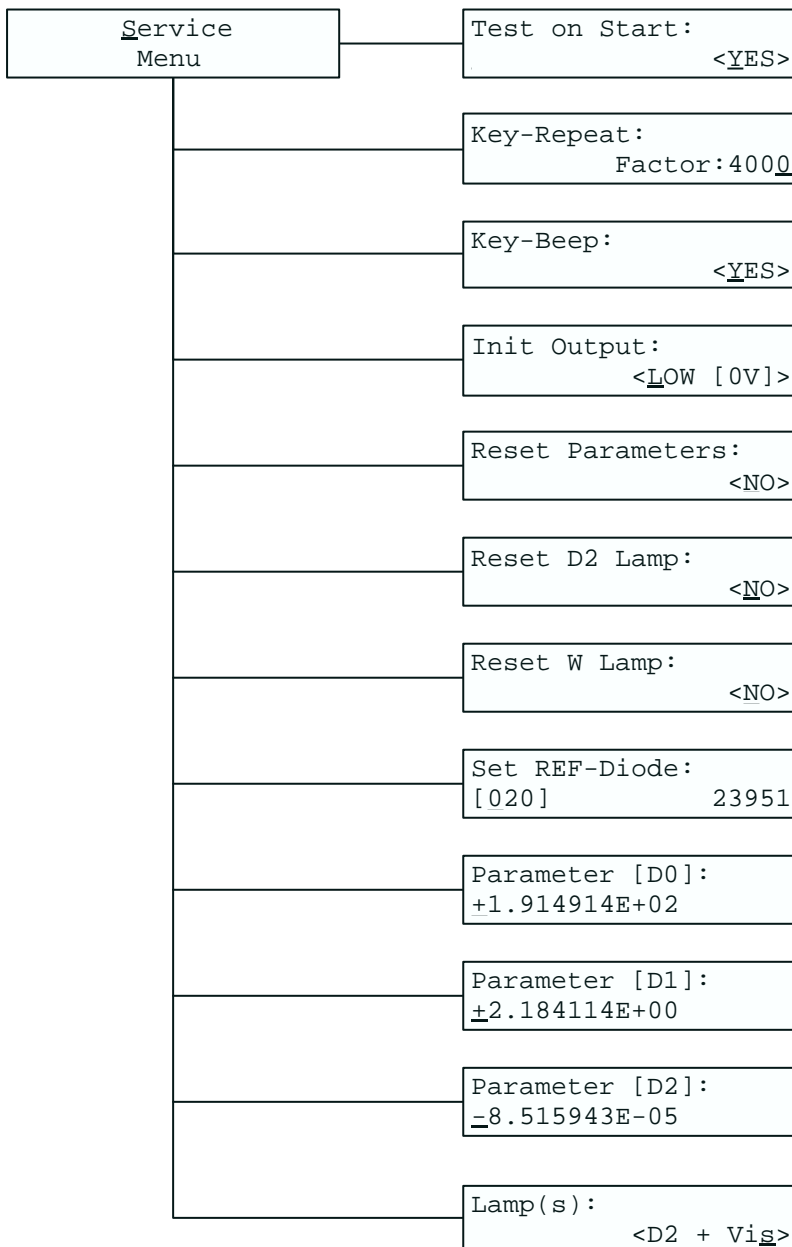
To leave the DAD – Modus press 

APPENDIX 1: THE SERVICE MENU

APPENDIX 1: THE SERVICE MENU

Sometimes you have to change some device parameters, e.g. if you have exchanged the Deuterium lamp.

To activate the Service Menu press the **AUTOZERO** and **MENU** key for about 2 seconds.



Picture 12: Service Menu Diagram

APPENDIX 1: THE SERVICE MENU

Test on Start

Here you can select if the self-test should be running at the start or not.

Use the **UP** and **DOWN** keys to change the current value.

Key-Repeat

Here you can change the sensitivity of the keyboard. The default value is 2.

Use the **UP** and **DOWN** keys to change the current value.

Key-Beep

Here you can TURN on or off the key beep.

Use the **UP** and **DOWN** keys to change the current value.

Init Output

This option is only used for initialization of the analog output. Here you can output a specific voltage at the analog output. You can select between <LOW [0V]> and <HIGH [1V]>.

Use the **UP** and **DOWN** keys to change the current value.

Reset Parameters

Here you can reset a specific data. You can reset the parameters (wavelength, range,...) to a default value. You will only need this option after a problem with the memory battery.

Use the **UP** and **DOWN** keys to change the current value.

ATTENTION: If you reset the Parameters, the parameters A0 to A3 (see below) are also reset. Afterwards you HAVE TO set these parameters again specific to your device. The values for these parameters you can find at the inside of the front panel of the detector.

Reset D2 Lamp

Here you can reset the statistics of the Deuterium lamp. You will need this after the exchange of the D2 lamp.

Use the **UP** and **DOWN** keys to change the current value.

Reset W Lamp

Here you can reset the statistics of the Tungsten lamp. You will need this after the exchange of the Tungsten lamp.

Use the **UP** and **DOWN** keys to change the current value.

Set REF-Diode

Here you can select the reference peak. This peak is used for calibration and the calculation of the lamp energy. This peak is around diode [21]. Normally do not change this value. It is preset at our facility.

APPENDIX 1: THE SERVICE MENU

Use the **UP** and **DOWN** keys to change the current value. Confirm the selection with the **AUTOZERO** key.

Parameter [D0] - Parameter [D2]

Normally DO NOT changes these parameters. They are specific to each device depending on the optic module. These three parameters are used to assign each diode to the correct wavelength.

Use the **UP** and **DOWN** keys to change the current value. With the **AUTOZERO** key you can step through the digits.

ATTENTION: If you reset the Parameters, the parameters D0 to D3 are also reset. Afterwards you **HAVE TO** set these parameters again specific to your device. The values for these parameters you can find at the inside of the front panel of the detector.

Lamp(s)

Here you can select which Lamp(s) you want to use. The possible values are **<Vis only>**, **<D2 only>**, and **<D2 and Vis>**.

Use the **UP** and **DOWN** keys to select the option.

APPENDIX 2: THE SERIELLE INTERFACE

INTRODUCTION

The serielle Interface (RS232) of the S 3210 enables the control and evaluation of the detector by a PC.

For a correct communication, connect the S 3210 and the PC with a standard serielle cable and use the following settings for the PC's COM-Port:

Baud Rate: 19200
Data Bits: 8
Stop Bits: 1
Parity: none
Flow Control: none

COMMANDS

An ASCII command set is used for communication with the S 3210. All commands are sent as strings to the detector.

The Detector answers every command. Either it sends the wanted information or it responds with a copy of the received command. This is used to provide error checking between the S 3210 and the PC.

Every command has to begin with a "@" and end with a "!". Also, every command has to be sent in UPPERCASE letters !

Command Set

Command	Description
GINFO	Get Device Information
START	Start Signal Transmission
STOP	Stop Signal Transmission
GVERS	Get Version Information
GWL	Get Wavelength
GRNG	Get Range
GRT	Get Risetime
GOFS	Get Offset
SCAN	Get Scan-Spectrum
GISD2	Get D2-Status

APPENDIX 2: THE SERIELLE INTERFACE

GISV	Get Vis-Status
GD2T	Get D2 Runtime
GD2S	Get D2 Strikes
GVT	Get Vis Runtime
GNRJ	Get Lamp Energy
DAZ	Do Autozero
DWL	Set new Wavelength
DRNG	Set new Range
DRT	Set new Risetime
DOFS	Set new Offset
DMODE	Set new Mode
DD0	Set Parameter D0
DD1	Set Parameter D0
DD2	Set Parameter D0

COMMAND DESCRIPTION

GINFO

Get device information

Parameter
none

Answer: @SCHAMBECK S3210!

START

Start Signal Transmission. Every 100 ms the Signal is sent via the RS232 to the PC with the following format: "@S:+0.00125!"

Parameter
none

Answer: @OK!

APPENDIX 2: THE SERIELLE INTERFACE

STOP

Stop Signal Transmission.

Parameter

None

Answer: @OK!

GVERS

Get Version information.

Parameter

none

Answer: @V:1.3.0!

GWL

Get Wavelength.

Parameter

none

Answer: @WL:254!

GRNG

Get Range.

Parameter

none

Answer: @R:0.1000!

GRT

Get Risetime.

Parameter

none

Answer: @RT:1.0!

APPENDIX 2: THE SERIELLE INTERFACE

GOFS

Get Offset.

Parameter

none

Answer: @OFFS:10!

SCAN

Get a complete Scan - Spectrum between 190 and 720 nm (only with Scan-Option). The detector does NOT answers with an ASCII string, but with a stream of data values. It transmits the data value for each Diode (256 Diodes) by first sending the data's High-Byte followed by the data's Low-Byte.

Parameter

none

Answer: s. Description

GISD2

Get D2-Status. Possible answers are ON or OFF.

Parameter

none

Answer: @D2:ON!

GISV

Get Vis-Status. Possible answers are ON or OFF.

Parameter

none

Answer: @VIS:ON!

GD2T

Get D2 Runtime in hours.

Parameter

none

Answer: @D2T:0012.4!

APPENDIX 2: THE SERIELLE INTERFACE

GD2S

Get number of D2 Strikes.

Parameter

none

Answer: @D2S:0003!

GVT

Get Vis Runtime in hours.

Parameter

none

Answer: @VT:0012.4!

GNRJ

Get Lamp energy in %.

Parameter

none

Antwort: @ED:125!

DAZ

Do Autozero.

Parameter

none

Answer: echo

DWL=n

Set new Wavelength

Parameter

n New Wavelength [190 - 720]

Answer: echo

APPENDIX 2: THE SERIELLE INTERFACE

RNG=n

Set new Range.

Parameter

0	0.005 AU
1	0.0010 AU
2	0.0025 AU
3	0.0050 AU
4	0.0100 AU
5	0.0250 AU
6	0.0500 AU
7	0.1000 AU
8	0.2500 AU
9	0.5000 AU
10	1.0000 AU
11	2.0000 AU

Answer: **echo**

DRT

Set new Risetime.

Parameter

1	0.1 sec
5	0.5 sec
10	1.0 sec
20	2.0 sec
50	5.0 sec

Answer: **echo**

DOFFS=n

Set new Offset.

Parameter

0-20 New Offset in %

Answer: **echo**

APPENDIX 2: THE SERIELLE INTERFACE

DMODE=n

Set new Mode.

Parameter

0 High Resolution
1 High Sensitivity

Answer: echo

DD0=n

Set Parameter D0.

Parameter

D0 Factor in scientific notation (e.g. -1.361270E-04)

Answer: echo

DD1=n

Set Parameter D1.

Parameter

D1 Factor in scientific notation (e.g. -1.361270E-04)

Answer: echo

DD2=n

Set Parameter D2.

Parameter

D2 Factor in scientific notation (e.g. -1.361270E-04)

Answer: echo