

Application Software for Remote Control of a Photoacoustic Gas Monitor and a Multipoint Sampler and Doser

Advanced Ventilation Software 7651

- Synchronizes the functions of a Sampler and Doser unit to the measurement cycle of a Gas Monitor
- Flexibility in the choice of tracer gas, SF₆ or Freon 134a
- Stores up to five gas concentrations, air humidity and amount of tracer gas delivered
- Enabling all tracer gas methods: concentration decay, constant injection and constant concentration
- Calculates air exchange, age-of-air and air flow in ducts
- Up to nine curves can be shown, allowing direct comparison of results from different locations



The Advanced Ventilation Software 7651 from LumaSense Technologies enables remote control of a 1512 or a 1412i Photoacoustic Gas Monitor and a 1403 Multipoint Sampler and Doser unit. The software coordinates the functions of the instruments to form a monitoring system which, via tubing, can perform ventilation and air exchange measurements. The system can also perform gas-monitoring tasks in up to 6 different locations.

When the user configures a measurement task using the software, the task is performed automatically and the data is collected and displayed on the screen. When the measurement is complete and during measurement, the data processing facilities of the software are used to calculate the parameters that the user requires.

Getting Started

The Gas Monitor and Sampler and Doser unit are connected to the computer via USB.

The user decides where the measurements will be performed and connects the Sampler and Doser unit to these locations with tubing. The locations can then be "dosed" with tracer gas, and air samples can be taken to be analyzed by the Gas Monitor (see Figure 1).

The user starts the 7651 software and selects the type of measurement task to be performed. This can be either a ventilation measurement task, using both the doser and the sampler functions on the 1403 unit, or a multipoint gas monitoring task, using only the sampler system of the 1403 unit.

Application Areas:

- Ventilation and air exchange measurements using tracer gases in up to 3 locations
- Flow in ducts
- Multi-gas monitoring in up to 6 locations
- Tracking of pollutant spread
- Multi Gas Monitoring e.g. Freon 134a and CO₂ as complimentary marker in indoor air quality applications

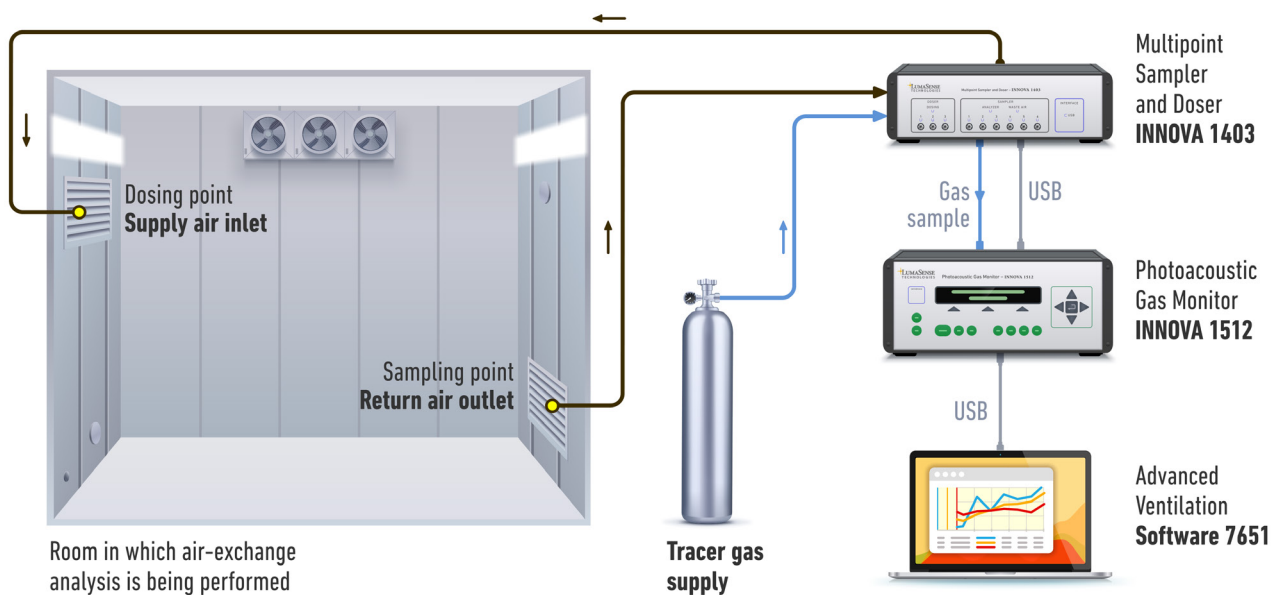


Figure 1: The 1512 Photoacoustic Gas Monitor and 1403 Multipoint Sampler and Doser unit are connected to the computer via USB. The user decides where the measurements will be performed and connects the Sampler and Doser unit to these locations with tubing. The locations can then be “dosed” with tracer gas, and air samples can be taken to be analyzed by the Gas Monitor.

Measurement Modes

Ventilation Measurement Tasks

The 7651 enables comprehensive ventilation measurements. The use of a Multipoint Sampler and Doser unit allows up to 3 dosing and 6 sampling points.

The user sets up the sampler and doser unit by selecting the dosing/sampling channels and the type of dosing to be used in the task. Dosing can be done either by providing a constant flow of tracer gas to one location or by maintaining a constant concentration of tracer gas at up to three locations. Up to six different dosing setups can be made and stored by the 7651 and the user can switch between different setups during a measurement task. The software controls the Gas Monitor and which gases to be measured at each location (Figure 2).

When setup is complete, the measurement task can be started. The 7651 runs the measurement procedure automatically and measurement results are displayed on the computer’s screen and can be stored for further analysis.

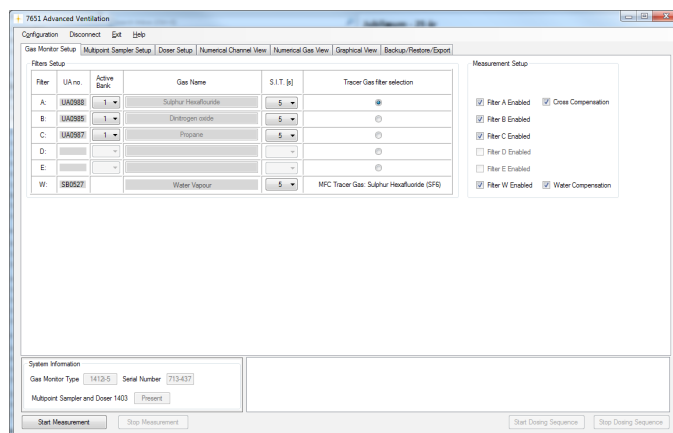


Figure 2a: The Gas Monitor Setup dialog. This dialog enables the user to select the number of gases the monitor will measure, the sampling interval, and define whether the monitor should perform water and cross-compensation.

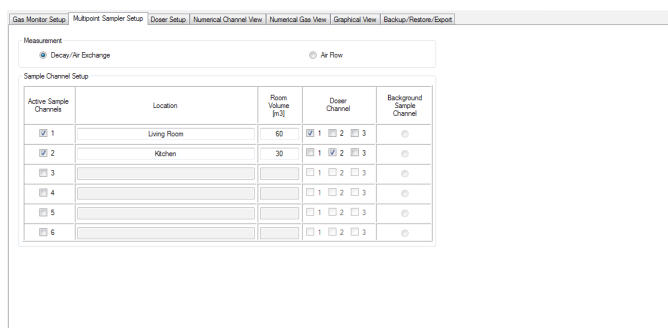


Fig 2b: The Multipoint Sampler and Doser setup, allows you to define which doser channel is linked to a given named Location.

Doser settings

Up to 6 different doser setup's can be predefined and used during the analysis see figure 3.

In the Dosing setup it is possible to predefine up to 6 different dosing setup's the user can then change between these dosing setup's while a measurement is running.

The Algorithm is used to define if constant dose or constant concentration method is to be used during the measurement.

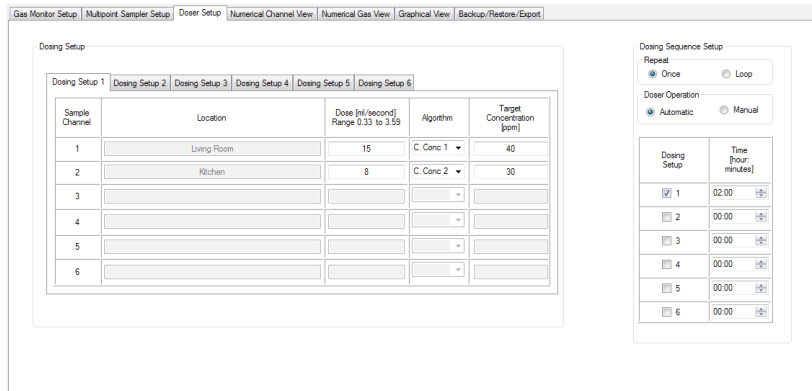


Figure 3: The Doser setup

Software Features

Data Exchange Capability

The Advanced Ventilation Software contains Backup/Restore and Export functionality.

A Backup session can be used to backup the current session to be restored again later.

The Export functionality allows setup and measurement data to be exported to Excel or as a csv file.

Data Display and Output

Measurement data and the running status of the instruments are displayed on-screen. Measurement data can be presented as a graph (Figure 4) or in a numerical table form (Figure 5) in either channel view or gas view; each is updated as new data is received.

When using the graph format, the data displayed as the curves can then be processed, as described in the following section.

Calculation of Results

The user selects the data to be used for further processing by marking the curves with the two vertical cursors. The 7651 is then able to calculate the following values: minimum, maximum, average, and standard deviation of gas concentrations together with the air exchange, age of air, or air flow.

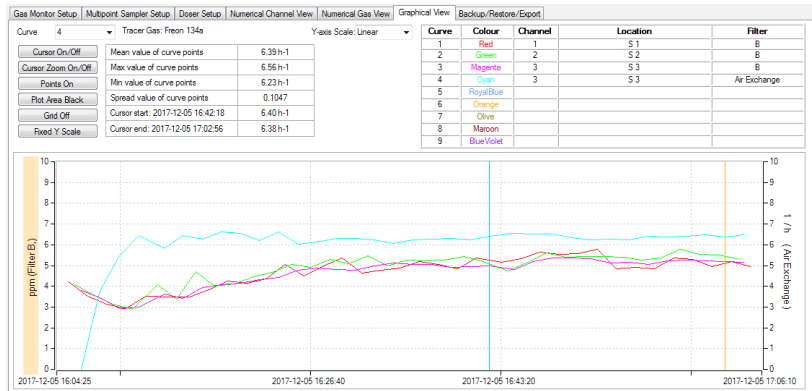


Figure 4. Graph View

Date & Time	Filter A [ppm]	Filter B [ppm]	Filter C [ppm]	Filter W [T Dew]	Air Exchange [1/h]	Dosage Given [N]	7651 Flag	Monitor Flag	1403 Flag
14:49:19 Jul 04, 2016	3.57	0.89	1.96	17.53	1.78	42.96			
05:49:19 Jul 05, 2016	7.97	1.89	4.16	17.93	3.79	77.31			
14:49:19 Jul 06, 2016	11.28	2.82	6.2	18.34	5.64	64.66			
13:49:19 Jul 08, 2016	14.73	3.68	8.1	17.67	7.36	47.52			
13:49:19 Jul 09, 2016	17.96	4.49	9.88	18.34	8.98	68.68			
14:49:19 Jul 11, 2016	20.39	5.25	11.54	17.81	10.5	63.96			
18:49:19 Jul 12, 2016	23.85	5.96	13.12	18.23	11.92	60.93			
09:49:19 Jul 14, 2016	26.55	6.64	14.6	17.71	13.28	53.55			
20:49:19 Jul 15, 2016	29.12	7.28	16.02	18.39	14.56	44.63			
00:49:19 Jul 17, 2016	31.56	7.89	17.36	17.98	15.78	70.87			
16:49:19 Jul 18, 2016	33.89	8.47	18.64	17.62	16.94	56.05			
22:49:19 Jul 19, 2016	36.11	9.03	19.86	17.59	18.06	47.11			
06:49:19 Jul 20, 2016	38.24	9.56	21.03	17.73	19.12	48.84			
12:49:19 Jul 21, 2016	40.28	10.07	22.15	18.4	20.14	46.25			
07:49:19 Jul 23, 2016	42.34	10.56	23.23	17.97	21.12	46.51			
19:49:19 Jul 24, 2016	44.13	11.03	24.27	18.49	22.07	79.8			
20:49:19 Jul 26, 2016	45.95	11.49	25.27	18.13	22.98	58.25			
08:49:19 Jul 28, 2016	47.71	11.93	26.24	18.11	23.85	78.5			
06:49:19 Jul 30, 2016	49.4	12.35	27.17	17.94	24.7	74.83			
05:49:19 Aug 01, 2016	51.04	12.76	28.07	18.05	25.52	63.32			
02:49:19 Aug 03, 2016	52.63	13.16	28.95	18.37	26.31	56.35			
04:49:19 Aug 05, 2016	54.17	13.54	29.79	17.6	27.08	48.33			
06:49:19 Aug 06, 2016	55.66	13.92	30.61	18.27	27.83	71.97			
07:49:19 Aug 08, 2016	57.11	14.28	31.41	18.01	28.56	44.99			
10:49:19 Aug 09, 2016	58.52	14.63	32.19	17.77	29.26	74.99			

Figure 5a. Numerical Channel View

Date & Time	Channel 1 [ppm]	Channel 2 [ppm]	Air Exchange [1/h]	Dosage Given [N]	7651 Flag	Monitor Flag	1403 Flag	Comment
2017-10-04 17:45:52	40.638	0	0	0	0	0	0	
2017-10-04 17:45:07	40.409	4.6231	0.15401	0	0	0	0	
2017-10-04 17:44:23	42.295	4.4781	0.17725	0	0	0	0	
2017-10-04 17:43:38	42.295	4.4781	0.17725	0	0	0	0	
2017-10-04 17:42:53	44.341	0	0	0	0	0	0	
2017-10-04 17:42:09	42.542	4.6222	0.16219	0	0	0	0	
2017-10-04 17:41:24	40.483	0	0	0	0	0	0	
2017-10-04 17:40:39	40.602	4.1743	0.19011	0	0	0	0	
2017-10-04 17:39:55	45.841	0	0	0	0	0	0	
2017-10-04 17:39:10	39.074	4.4109	0.16087	0	0	0	0	
2017-10-04 17:38:26	44.324	36.934	0	0	0	0	0	
2017-10-04 17:37:41	44.324	4.2291	0.20224	0	0	0	0	
2017-10-04 17:36:56	35.545	0	0	0	0	0	0	
2017-10-04 17:36:11	42.832	4.2821	0.1628	0	0	0	0	
2017-10-04 17:35:26	40.302	0	0	0	0	0	0	
2017-10-04 17:34:41	42.623	4.479	0.16398	0	0	0	0	
2017-10-04 17:33:52	40.069	0	0	0	0	0	0	
2017-10-04 17:33:07	41.924	4.5479	0.14971	0	0	0	0	
2017-10-04 17:32:23	40.876	0	0	0	0	0	0	
2017-10-04 17:31:38	45.251	4.2121	0.16289	0	0	0	0	
2017-10-04 17:30:53	41.847	0	0	0	0	0	0	
2017-10-04 17:29:49	42.417	4.6184	0.18125	0	0	0	0	
2017-10-04 17:29:04	40.152	0	0	0	0	0	0	
2017-10-04 17:28:20	44.065	4.4729	0.17696	0	0	0	0	
2017-10-04 17:27:35	37.123	0	0	0	0	0	0	

Figure 5b. Numerical Gas View

Technical Specifications

The 7651 software and manual are supplied on a USB Memory Stick and comes with a Security Dongle, which ensures that only authorized users can perform measurements. Data analysis on existing data files can be done without the Security Dongle.

System Requirements

INNOVA 1412i Photoacoustic Gas Monitor.

Or

INNOVA 1512 Photoacoustic Gas Monitor.

And

INNOVA 1403 Multipoint Sampler and Doser

Cables:

Computer to Monitor:

USB Cable AS0001

Gas Monitor to 1403:

USB Cable AS0001

Computer Requirements

The Software is targeted to work on a Microsoft Windows® Operating System:

The computer must meet the following minimum requirements:

Processor: Intel dual-core i3 or compatible.

Operating System: Windows® 7 (Service Pack 1), Windows® 8.1 or Windows® 10.

RAM: Min. 4 GB

Hard Disk: Minimum 500 MB of available space may be required.

Display: HD resolution monitor 1366 X 768 pixel or higher with small fonts.

USB ports: 1 USB port for connection to the Gas Monitor and 1 USB port for the security dongle.

Data Exchange Capability

Data can be exported to Microsoft Excel or as a csv file. Backup and restore of sessions is possible.

Calculation of Values

The 7651 can calculate the values of the following parameters from the curves printed from measurement results:

- Mean value of curve points
- Spread of curve points
- Minimum/maximum values on curve
- Air-exchange
- Local-mean age-of-air
- Air Flow

Ordering Information	Basic System Requirements	Configured System
7651 Advanced ventilation Software for control of Tracer-Gas Monitoring System Includes the following accessories: • Instruction Manual • Security Dongle	Photoacoustic Gas Monitor 1412i Or Photoacoustic Gas Monitor 1512 And Multipoint Sampler and Doser 1403 Computer Teflon TubingAF0614 Red Nylon Tubing AF0005 Green Nylon Tubing AF0006 Nylon TubingAF0007 Cables: From initial cap Computer to Monitor: USB cableAS0001 From Monitor to Sampler USBAS0001	Type 3751-2 Tracer gas system with a dual gas monitor: 1512-2* + 1403 + 7651 Type 3751-5 Tracer gas system with a multi-gas monitor: 1512-5* + 1403 + 7651 * Optical filters and Calibrations are not included



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