

## **Additional methods of maintenance beyond those prescribed by the manual for the Andersen RAAS-300 Sequential Air Sampler.**

When operating the Andersen RAAS-300 Sequential Air Sampler (herein referred to as Andersen Sequential or “sampler”), it is necessary to adhere to procedures prescribed by the operating manual for consistent and correct operation. This write-up will suggest additional measures that one may take in order to further insure proper operation and provide more preventative maintenance.

It is important that the operator be familiar with the characteristics of their monitor both in terms of programming and in a mechanical sense. Every individual sampler should always be as current, or updated, as possible. The operator should be aware of issues concerning their sampler model and should watch out for parts or software upgrades from the manufacturer. These upgrades may correct or improve the functional capability of the sampler, likely making the sampler easier to operate and maintain. Beyond software and parts improvement by the manufacturer, it is the operators responsibility to stay on top of what consumables and equipment they might need and the time tables set forth for the proper maintenance of the monitor. In most every case, the time table for inspection and maintenance is directly from, or derived from the U.S. EPA 2.12 Quality Assurance Handbook, Section 8.

### **Additional Maintenance Recommendations:**

The first recommendation is that operators with Internet access should go to the Andersen website at <http://www.graseby.com> where they can access update information, technical notices, and other information pertaining to their instrument.

Another valuable resource for sampler operators is the U.S. EPA website called the Ambient Monitoring Technology Information Center (AMTIC), located at <http://www.epa.gov/ttn/amtic/>. AMTIC contains information and files on ambient air quality monitoring programs, details on monitoring methods, relevant documents and articles, information on air quality trends and non-attainment areas, and federal regulations related to ambient air quality monitoring. Specifically, the PM2.5 forum provides a place where operators may post observations, opinions, and questions (and answers) for the whole monitoring community to respond to, in regard to most any PM2.5 issue.

Please note that in this write-up, any reference to a particular problem (or lack of reference) does not indicate that the problems in question or other problems have not been identified and addressed by the vendor.

**Passive deposition:** There is a question of the potential for passive deposition on filters sitting in the filter carousel. Since the lid that covers the filter tray/carousel does not entirely cover the filter cassettes (there is a gap from the lid to the top of the cassettes), the opening could allow access for fugitive particles to contaminate filters. The main defense for passive deposition is to keep the inside of the sampler clean, wiping away dust or pollen whenever necessary so that a build up does not occur that may enhance that chance of contamination. Also, it is wise to make sure that the cooling fan is working properly and that the filter for the fan is relatively clean and properly in place. Andersen has updated the back of the sampler where the cooling fan and filter are located. Note the difference in the

backs in Figure1, where the old back is a small shield covering the fan and the filter with an opening on the bottom. The new back is a louvered back with multiple openings on the back surface and contains a larger filter inside.

**Figure 1.** Showing the difference between the Andersen sequential's old back (on left) and the newer louvered back (on right) .

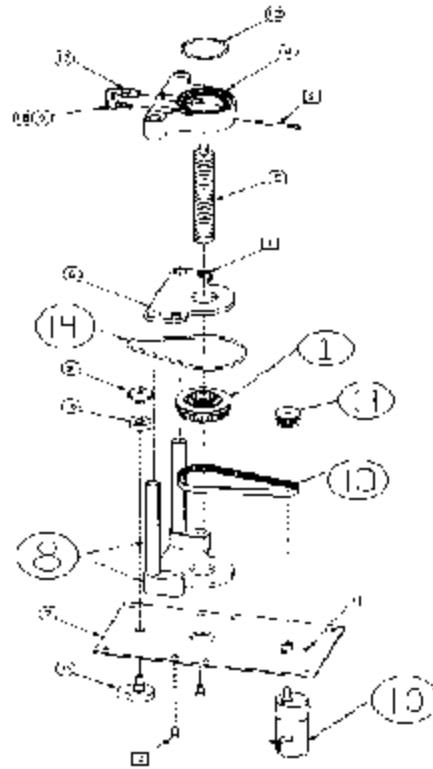


**Filter cassette elevator:** There have been some noted problems with the cassette elevator mechanism (or vertical mechanism), which rises to push the cassette against the bottom of the WINS so sampling may occur.

One problem is with the timing pulley (part #3 , Figure 2) which is attached to and rotated by the electric motor (part #10, Figure 2). The timing pulley is fastened to the motor by two half-moon brackets (highlighted in Figure 3) which if not tightened enough, will allow the cam from the motor to spin freely without rotating the timing pulley. The operator wants to make sure the brackets are in good condition, i.e, not warped or rusted, and that it is fitted properly onto the electric motor cam-shaft. The operator also wants to make sure that the toothed belt (part #13, Figure 2) is also in good shape and is taunt around the timing pulley and the drive wheel (part #1, Figure 2).

The operator may also want to periodically check all the parts of the cassette elevator mechanism such as the larger O-ring (part #14, Figure 2) and the status of the drive shaft (part #5, Figure 2) and vertical mounting rods on the mount bottom (part #8, Figure 2) for any rust, excess wear, or other deficiency.

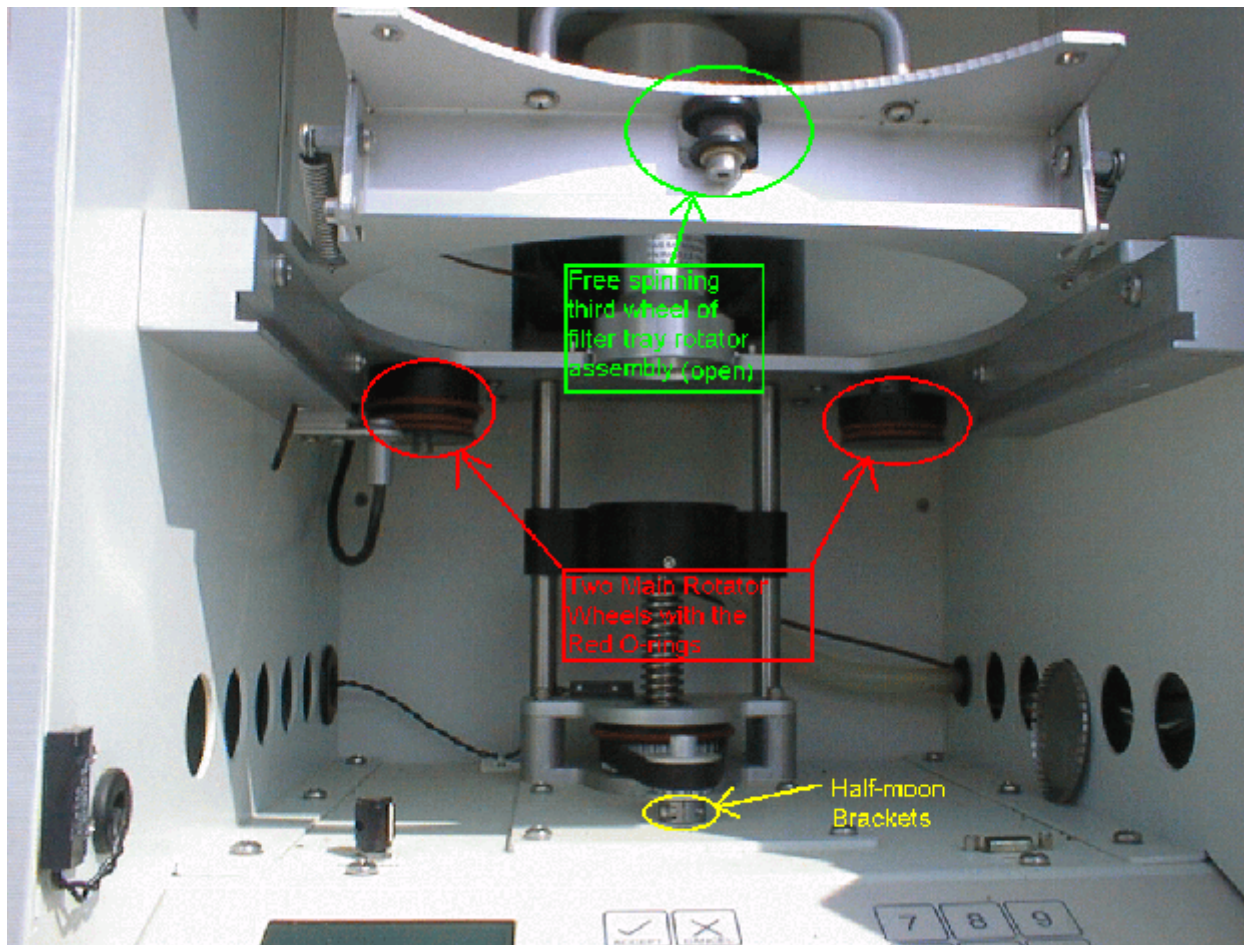
**Figure 2.**  
Diagram of  
Andersen sequential  
filter cassette  
elevator or vertical  
mechanism.



**Filter tray/carousel rotator system:** The filter tray/carousel holds up to eight filter cassettes which are rotated in series to be used for sampling. Each filter position is recognized by the sampler software by magnets adjacent to each filter. The filter tray is held in place by three adjacent rotating wheels. The two main wheels that turn the tray are towards the back of the sampler, and the third wheel is a free spinning wheel on the front of the tray enclosure (see Figure 4). On the back, main wheels are red, rubber o-rings (see Figure 3) which over time may wear down or shred. As these o-rings are used shavings may eventually come off and get loose inside the main compartment. Additionally, when these o-rings wear out, the filter tray may not rotate properly, if at all. The operator needs to keep a check on the wear of the red o-rings so that they do not fail, possibly creating a mess of shavings in the main compartment, or preventing a programmed sample event to fail to run.

**Figure 3.** Showing a used red, rubber o-ring that was cut off of one of the main rotator wheels.





**Figure 4.** Showing an open filter tray rotator assembly, pointing out several parts of interest.

### Miscellaneous recommendations:

- S It is a good idea to regularly check the door hinges and weather striping along the door frame so that the interior of the sampler is as sealed off from outside contaminants as is possible.
- S All samplers should be secured to their location so that in the event of being bumped, hit, or subjected to severe weather (high winds), the sampler will not tip over and cause damage.
- S Recently, a problem was discovered where the pump can fail in a manner that draws excessive current through the control electronics. To correct this, Andersen created an in line pump fuse that would curb such power surges caused by pump failure. This is an example of a parts upgrade that operators should be aware of so that their sampler is always running at optimum capability and with the most current parts.