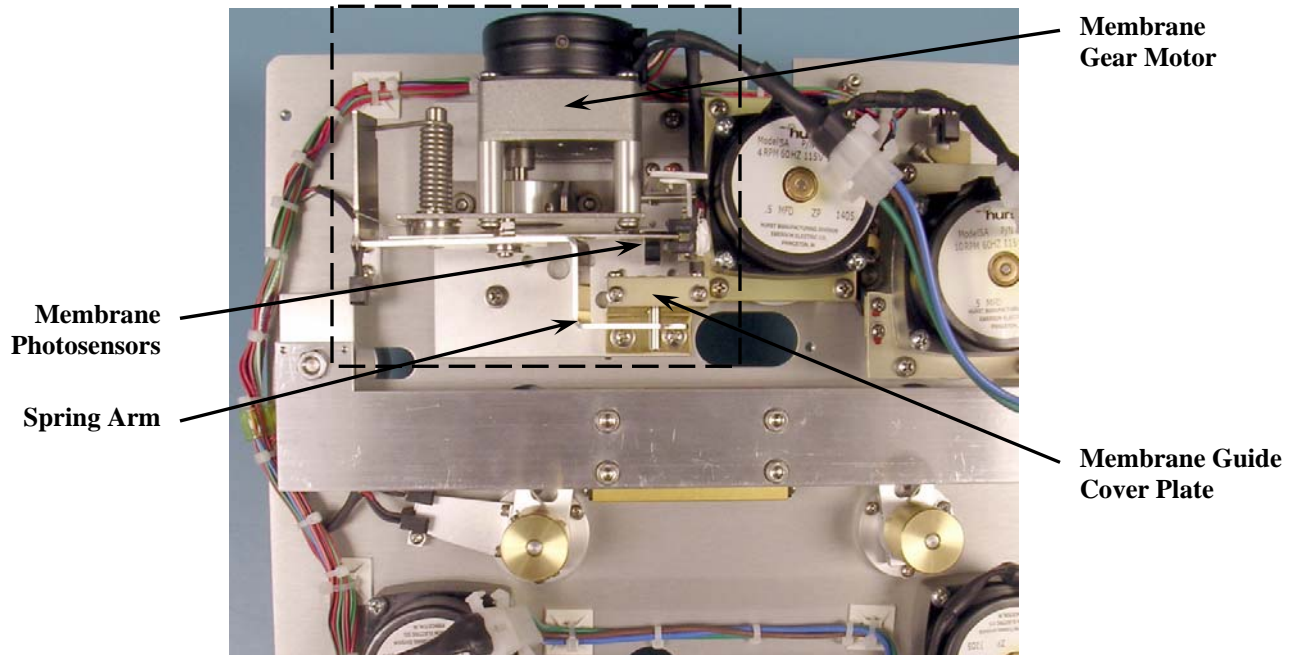


BAM-1020 Span Membrane Cleaning Procedure

All BAM-1020 units contain an actuator which extends the span membrane between the beta source and detector for the automatic hourly span stability check. Each BAM is programmed with the expected mass of its span foil (ABS setting). If the hourly measured mass of the membrane does not match the expected mass within $\pm 5\%$, then the BAM generates a “D” or “Deviant membrane density” alarm in the error log. If frequent “D” alarms appear in the BAM error log, then there are only a few possibilities:

- The membrane foil may be dirty. Any dust or residue on the foil surface will cause its mass to measure too high. This is the most common cause of “D” alarms.
- The membrane foil may be punctured or damaged. If so, this can cause the mass to measure incorrectly, typically too low.
- The metal tab that holds the span foil may get stuck partially extended or partially retracted so that the metal part obstructs the beta particles, causing a large error of the mass. This is rare.
- Someone may have accidentally changed the **ABS** expected mass value, or the **K-factor** or **μ sw** calibration values in the BAM setup menu. If any of these have changed from the factory settings, it would affect the membrane results!
- The beta detector tube may be burning out. If all other possibilities are eliminated, then the detector may need to be replaced at the factory. This requires a recalibration of the BAM-1020. The detector typically lasts at about eight years continuously.



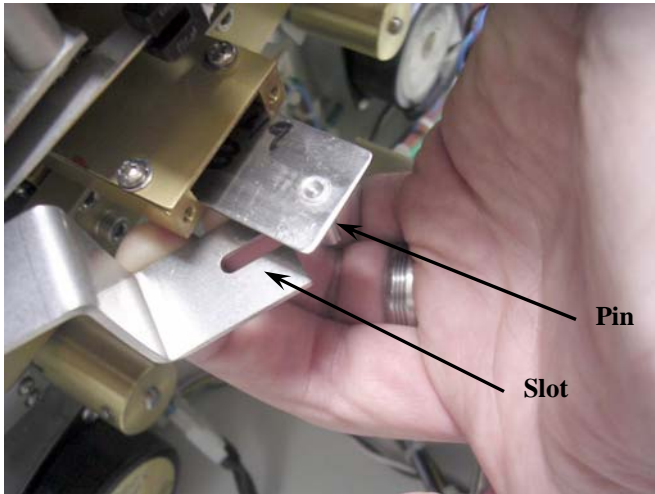
Membrane actuator assembly shown from the back side of the tape transport

The membrane assembly is very easy to remove from the actuator for inspection or replacement:

1. Remove the ten screws from the BAM case cover and set the cover aside.
2. Identify the membrane actuator assembly as shown in the photo above. All vintages of BAM-1020 have nearly identical membrane actuator systems.
3. Power up the BAM and enter the TEST > COUNT screen. The MEMBRN and NO MEMBRN keys can be used to manually extend and withdraw the membrane. The membrane should just fit through the gap between the top of the filter tape and the bottom of the beta source without scraping against either. Make sure that the membrane extends and withdraws fully, and does not get stuck partially out.
4. A pair of photosensors watch the membrane extend and withdraw. If these sensors do not work or are not triggered, then “R” reference membrane alarms are logged. Make sure that the metal flag that interrupts the two photosensors does not get stuck

or hit either of the sensors during its in/out travel. The TEST > ALIGN > REF screen may be used to test the operation of the two photosensors. See the BAM-1020 manual Section 7.16.

5. Make sure that the membrane is withdrawn fully. Remove the two screws that retain the small cover plate on the back of the brass membrane guide and set the cover aside. Use your hand to pull the spring-loaded membrane arm backward, so that the membrane is removed out of the back of the brass guide. Note how the pin on the membrane fits into the slot on the arm.
6. Inspect the membrane and take care not to damage the delicate foil material. The surface should be clean and undamaged. If the membrane foil is dusty, carefully blow it off with canned dusting air. Sometimes a rinse with distilled water works well. If there is any oily residue on the foil, then compact disk cleaning solution can be used, followed by a rinse. Do not scrub the foil surface or it may be damaged! There must be no moisture or residue of any kind on the foil after cleaning. Do not use isopropyl alcohol to clean the foil.



Inserting the membrane into the actuator assembly



8069 Membrane Assembly

7. Reinsert the membrane into the actuator assembly. Be sure to insert the membrane pin into the slot in the end of the spring arm or the assembly will not operate! Have the BAM extend and withdraw the membrane a couple of times using the TEST > COUNT screen to make sure it works correctly.
8. The BAM must be warmed up for one hour before measuring the membrane mass. Enter the TEST > CALIBRATE screen. Press the START button and allow the BAM to manually measure the mass of the membrane. This will take about 8 minutes per test. The "CAL MASS m" value is the measured mass of the membrane in mg/cm^2 . Compare this to the expected ABS mass value in the BAM and on the calibration certificate. The measured mass typically agrees within about 10 micrograms when the membrane is clean.
9. Repeat the measurement three times and verify that all three are within 5% of the expected mass. Within 2% is typical.

If the membrane foil is damaged, the 8069 membrane assembly will need to be replaced. The new one will come with a factory measured mass written on the metal tab. This value will be entered into the BAM as the new ABS value. Contact the Technical Service department if difficulty is encountered.