

National Human Exposure Assessment Survey (NHEXAS)

Region 5 Study

Quality Systems and Implementation Plan for Human Exposure Assessment

Research Triangle Institute
Research Triangle Park, NC 27079
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Standard Operating Procedure

NHX/SOP-160-005

Title: Cahn 29 Electrobalance

Source: Research Triangle Institute

U.S. Environmental Protection Agency
Office of Research and Development
Human Exposure & Atmospheric Sciences Division
Human Exposure Research Branch

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TITLE: STANDARD OPERATING PROCEDURE FOR CAHN 29 ELECTROBALANCE

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CAHN 29 ELECTROBALANCE

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1.0 INTRODUCTION

Quantitative analytical results often depend directly on accurate weight determinations of various items used in the analytical procedure. To ensure that this crucial piece of equipment is properly calibrated and maintained with appropriate documentation, strict adherence to this SOP is required. Calibration, maintenance, and inspection of the balance are the responsibilities of the analytical chemist.

2.0 INSTRUMENTATION

The Cahn 29 is an Automatic Electrobalance with a range of 250 mg for Loop A and 1250 mg for Loop B (see attached diagram) and readability of 0.0001 mg; 0.001 mg, respectively. It is designed for weights up to 3.5 grams and is sensitive to changes as small as 0.1 micrograms.

3.0 GENERAL INSTRUCTION MANUAL

A copy of the instruction manual is kept in 119 Dreyfus. Instructions for operating the balance are kept proximate to the balance along with the balance logbook.

4.0 CALIBRATION

The balance is calibrated annually by the manufacturer or manufacturer's representative.

5.0 CALIBRATION VERIFICATION

The calibration of the balance should be verified each time power is lost. Calibration should be checked each time the balance is moved, cleaned, and at other intervals depending upon usage and project protocol. Prior to calibration the balance must be turned on for a minimum of 1 hour.

NOTE: The calibration weights (200 mg \pm 5.4 μ g and 1000 mg \pm 3.4 μ g) Class M are needed to calibrate the balance. Do not use these as tare weights. All weights are stored in Lab 119 Dreyfus.

5.1 Calibration in the 250 mg to 1.0 μ g Range (A loop)

- 5.1.1 Place a weighing pan on the A loop.
- 5.1.2 Place a similar weighing pan on the tare loop.
- 5.1.3 Press the range button until the balance is in the 200 mg or 250 mg range.
- 5.1.4 Zero the balance by pressing the TARE button.
- 5.1.5 Place the 200 mg calibration weight on the A loop pan.
- 5.1.6 Once the digital display has stabilized, push the CAL button once; 200.000 will appear on the meter. The balance has been calibrated. If 200.000 does not appear on the meter repeat steps 5.1.1-5.1.6. If 200.000 still does not appear contact Laboratory Supervisor.

5.2 Calibration in the 1250 μ g Range to 10 μ g Range (B loop)

- 5.2.1 Place a weighing pan on the B loop.
- 5.2.2 Place a similar weighing pan on the tare loop.
- 5.2.3 Press the range button until the balance is in the 1000 mg or 1250 mg range.
- 5.2.4 Zero the balance by pressing the TARE button.
- 5.2.5 Place the 1000 mg calibration weight on the B loop pan.
- 5.2.6 Once the digital display has stabilized, push the CAL button once; 1000.00 will appear on the meter. The balance has been calibrated. If 1000.00 does not appear contact Laboratory Supervisor.

5.3 Use of Scrolling

The calibration program has a scrolling function, with a range of 199.850 mg to 200.150 mg for the A loop and 999.25 to 1000.75 mg for the B loop. This allows you to use a

calibration weight certified by a meteorology lab if the weight falls within the scrolling range. Once you have matched the calibration target weight to your certified weight by using scrolling, the display will show that number when CAL is pressed.

The procedure below describes the use of scrolling. First follow section 5.1 for the 200 mg or 250 mg range calibration and section 5.2 for the 1000 mg or 1250 mg range calibration.

1. Press TARE to zero the balance.
2. Place your certified weight on the weighing pan.
3. Press the CAL button and 200.00 or 1000.00 will appear.
4. Immediately press the CAL button again and keep it depressed. The digital display will start counting up from 200.00 or 1000.00. The longer you depress the CAL button the faster the value on the digital display increases.
5. To avoid overshooting the value of your exact weight, release the CAL button about 10 micrograms before the number is reached.
6. The display will increase to 200.150 then reset itself to 199.850 or the display will increase to 1000.75 then reset itself to 999.25.
7. Press the CAL repeatedly as you slowly approach the value of your exact weight.

NOTE: If the power is lost, the display will read 200.00 or 1000.00 when CAL is pressed so you must rescroll the balance.

6.0 ROUTINE MAINTENANCE

At least once per month, the balance should be inspected for general cleanliness and operational status. Inspection is the responsibility of the Analytical Chemists. Problems should be reported to the Laboratory Supervisor.

7.0 NONROUTINE MAINTENANCE

In the event of a balance failure or malfunction, the Analytical Chemist is responsible for arranging appropriate repairs in order to return the unit to working specifications. The chemist will also ensure that the balance is not used until it is returned to an acceptable working state. Following any repairs, it must be demonstrated and documented that the balance is working correctly. This is accomplished by performing the calibration procedure described in Section 5.0.

8.0 DOCUMENTATION

A hard-bound book must be maintained for balance records. All calibration information must be kept in the hard-bound book, including:

1. Date of calibration.
2. Name of person performing the calibration.
3. Results of the procedure.

All maintenance operations must be recorded in the book. This includes balance cleaning and any service work required for proper operation of the balance. The book shall be kept in close proximity to the balance.

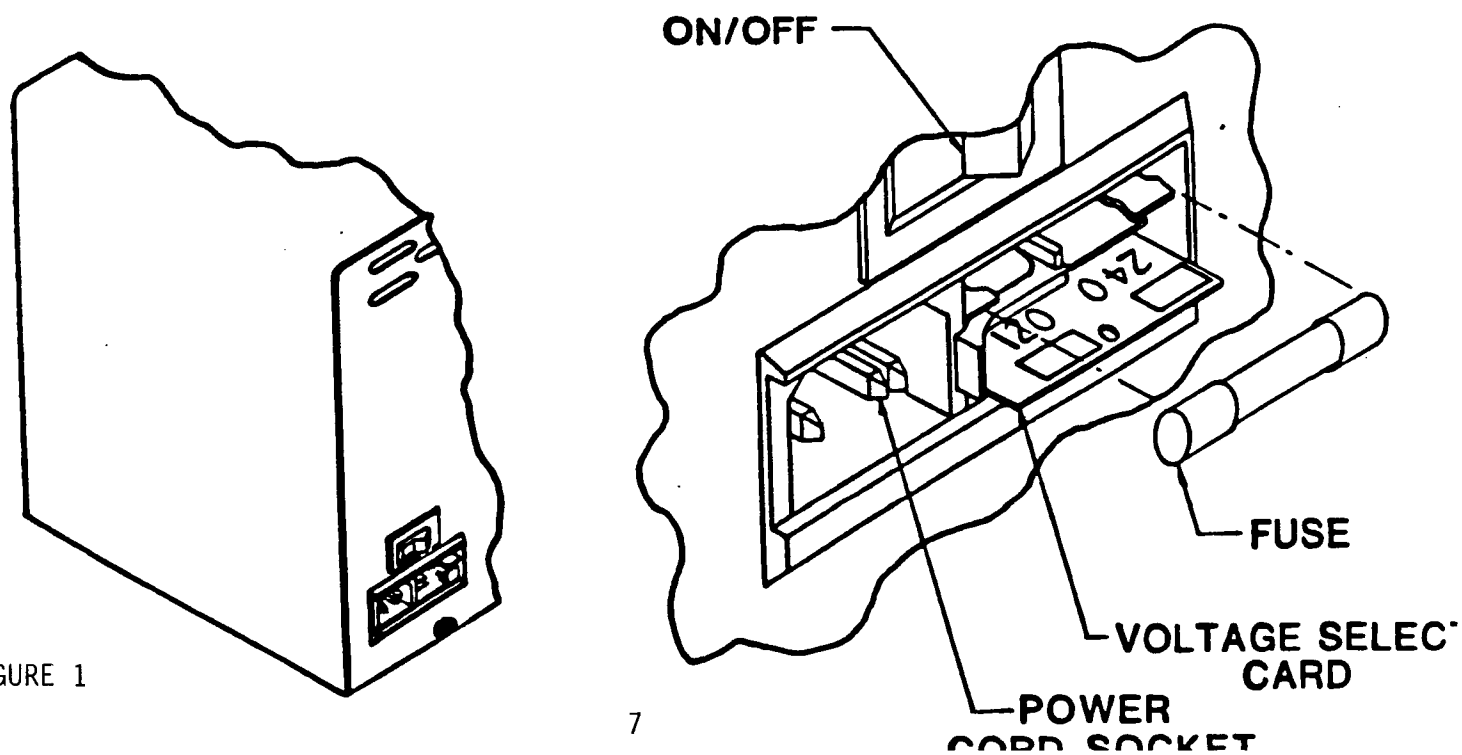
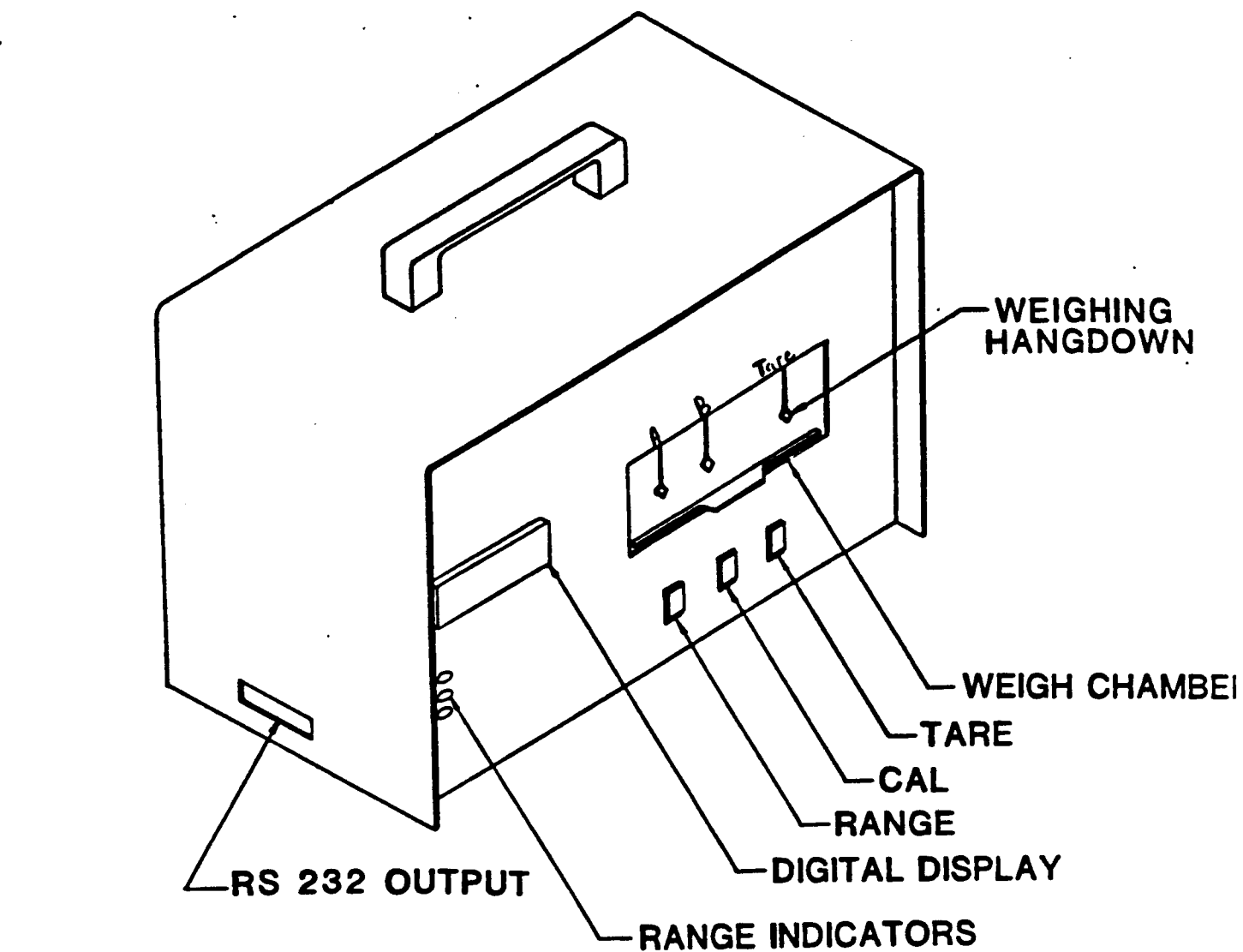


FIGURE 1