

# Using the HK-2 Microwave Insertion System to measure the °Brix, of a Sugar Solution.

## I. INTRODUCTION

- A. This write up will explain the setup for using the HK-2 to measure the Brix of a Sugar Solution. We will discuss the Vacuum Batch Pan, Vacuum Continuous Pan, and Pipelines.
- B. There are several parameters to check and one (1) measurement to make when setting up the HK-2 Microwave System.
- C. SINGLE POINT and MULTI POINT Calibrations are possible.
- D. The front panel of the HK-2 System looks like Figure 1. There are three (3) Hardware Keys and three (3) Soft Keys. You will use the six (6) buttons to program and operate the Microwave System. In the manual, I will only show the display when showing an example.

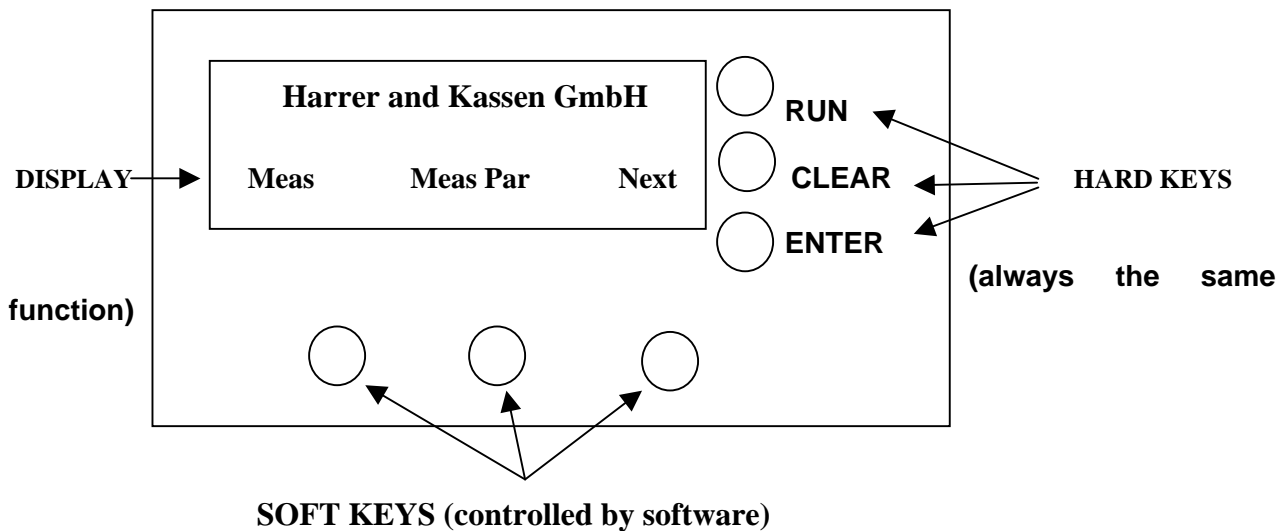


Figure 1 Front Panel of the HK-2

## II. Quick Set UP

- 1) When installing a Modular Unit HK-2M
  - a. Install the Transmitter as close as possible to the Insertion Sensor Pins.
  - b. Do not over tighten the coaxial connectors. Tighten with hand and snug with a wrench.
  - c. Take care that no water or dirt gets in to the coaxial connections.
  - d. Do not bend the coaxial cables directly at the connector.
  - e. Use tie raps to secure the cables to something fixed.
  - f. Protect the cables from being cut or moved after calibration.
- 2) When Installing the HK-2 Compact Unit
  - a. The Compact Unit must be installed on Pipelines or Vessels that do not have high vibration. Typical vibration levels found in most applications do not present a

problem.

- b. Make sure the mounting neck is as short as possible so the Sensor Pins are properly positioned in the liquid stream.
- c. The standard flange for mounting is 2-1/2" ANSI.

#### B. Calibration – Procedures for a Single Point Calibration

- Step 1: Check Slope (A1) and Offset (A0)
- Step 2: Perform the REFERENCE MEASUREMENT
- Step 3: Input Value of Lab Sample
- Step 4: Input Measurement Range

#### C. Checking and Setting Slope (A1) and Offset (A0) values

1. Select the Calibr. Menu from Display 1.
2. Select the Coef Sub Menu from display 2.  
Set the Offset (A0) = 0.00 for operation (Display 3).
3. Set the Slope (A1) with a value determined by manufacturer.  
Default is around -0.235 (Display 3).

#### D. PERFORMING THE REFERENCE MEASUREMENT:

1. The Reference measurement requires the following condition:
  - a. Stable, flowing material in the pipe or vessel.
  - b. No air and well mixed.

- Step 1: Select the System Menu from Display 4
- Step 2: Select Next from Display 5.

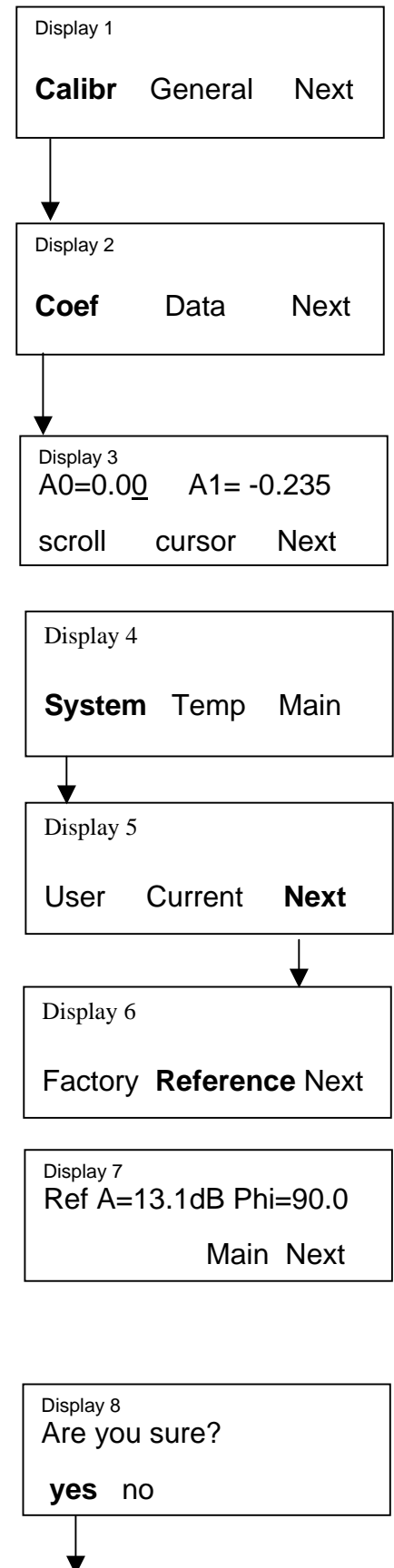
Step3: Select Reference Sub Menu from Display 6

Step 4: When in Display 7 press the **Run** button until you see Display 8.

Step 5: Answer yes from Display 8.

Step 6: Repeat Reference Measurement at least twice. Make sure The readings are stable, +/- 0.5 dB and +/- 20.0 Phi.

Step 7: Record new numbers which appear Display 9 for A= 29.0, And PHI=82.0 in Display 8.



**NOTE:** The values listed here in the manual, 29.0 dB and a Phi =82.0, are only examples and will be different for each application. However, there are MAXIMUM and MINIMUM allowed values for the A value.

Max allowed 55 dB  
Min allowed 5 dB

### E. Inputting Lab Value for Single Point Calibration

- Step 1: A sample of the Process Liquid must be collected at the same time The Reference Measurement is Performed.
- Step 2: Take sample to the lab for analysis of degrees Brix. Enter the Lab Value into the A0 of Display 40
- Step 3: Go to the Calibr Menu and the Coef sub menu (Display 40)
- Step 4: Input lab value, (example 70.0%) into Display 40. Press Enter
- Step 5: Go to Measure Screen and put system in RUN Mode. The reading should be close to what the actual is.
- Step 6: Take another sample to check the calibration. If the reading is off adjust the A0 value. If reading is to high by 1.0 Bx then change A0 to 69.0. If it is too low than change it to 71.0.

### III. Setting the Current Outputs

A. It is necessary to setup the Microwave System 4-20 mA Current Output so it outputs usable numbers. Our example, will span the output from 0 – 100%.

B. Setting the output of the 4 mA and 20 mA signals.

- Step 1: Select Meas. Par menu from display14.
- Step 2: Select next until display 15 is shown. Use scroll and cursor keys to input 0.0 % for the 4 mA  
When you see a 0.0% in display 15, Press Enter Key

E. Enter the value of 100.0 into the display 16 to set the 20 mA output.

**YOU ARE NOW READY TO RUN.**

Display 9  
Ref A=29.0dB Phi=82.0  
Main Next



Display 40  
A0=70.0 A1=-0.235  
scroll cursor next

Display 14  
Harrer and Kassen GmbH  
Meas **Meas Par** Next



Display 15  
Iout(0/4mA): 0.0 %H<sub>2</sub>O  
scroll cursor RUN next



Display 16  
Iout(20mA): 100.0%H<sub>2</sub>O  
scroll cursor RUN next