Koehler
INSTRUMENT COMPANY, INC.

K23060
SALT IN CRUDE ANALYZER

1 Introduction

The Koehler Salts-in-Crude Analyzer is a sophisticated instrument and designed for determining salt concentration in crude oils as per the ASTM D3230 test method. It is a multi-parameter analyzer that can display up to four parameters simultaneously.

This manual provides important information regarding safety, technical reference, installation requirements, operating condition specifications, user facility resource requirements, and operating instructions for the Salts-in-Crude Analyzer. This manual should also be used in conjunction with applicable published laboratory procedures. Information on these procedures is given in section 1.2.

1.1 Koehler's Commitment to Our Customers

Providing quality testing instrumentation and technical support services for research and testing laboratories has been our specialty for more than 50 years. At Koehler, the primary focus of our business is providing you with the full support of your laboratory testing needs. Our products are backed by our staff of technically knowledgeable, trained specialists who are experienced in both petroleum products testing and instrument service to better understand your requirements and provide you with the best solutions. You can depend on Koehler for a full range of accurate and reliable instrumentation as well as support for your laboratory testing programs. Please do not hesitate to contact us at any time with your inquiries about equipment, tests, or technical support.

Part Number	Description
K23050-1	Electrode Cap Assembly
K23050-3	Temperature Probe and Wire Assembly
K23060-4	Power Adapter, Dual Voltage 115/230V
K23060-6	Calibration Jack
K23060-8	Table Top Stand
K23000-CASE	Salt in Crude Case
332-002-017	100 mL Beaker

1.2 Recommended Resources and Publications

1. American Society for Testing and Materials (ASTM)
   100 Barr Harbor Drive
   West Conshohocken, Pennsylvania 19428-2959, USA
   Tel: +1 610 832 9500
   Fax: +1 610 832 9555
   http://www.astm.org
   email: service@astm.org

   ASTM Publication:
   - ASTM D3230: Salts in Crude Oil (Electrometric Method)

1.3 Instrument Specifications

Models:	K23060
Electrical Requirements:	115/230V 50/60Hz
Temperature Range:	-5 to +55°C
Resolution:	± 0.01°C
Accuracy:	± 0.02°C
Conductance Range:	0-2µS, 2-20µS, 20-200µS, 200-1500µS
Resolution:	0-2µS: ± 0.001µS 2-20µS: ± 0.001µS 20-200µS: ± 0.01µS 200-1500µS: ± 0.1µS
Accuracy:	±0.5% of range (±0.2% of high range)
pH Measurement	
Range:	0-14 pH
Resolution:	0.01 pH
Accuracy:	0.01 pH at point of calibration

4 Instrument Description

4.1 General Description

Koehler's K23060 is a sophisticated, portable instrument for the measurement of conductance and temperature in crude oil samples, plus pH in aqueous samples. In addition, it can utilize the conductance and temperature data to calculate and display salt concentration per ASTM D3230.

The K23060 has built in capability to record data and save to the database.

The device uses a 2.6" TFT display that provides complete and descriptive data presentations plus the ability to easily setup operational modes and parameters. Calibration data and system variables are maintained in non-volatile memory. These values will not be lost when power is turned off.

The instrument is contained in a weatherproof housing with sealed keypad for maximum protection in a harsh field environment. A benchtop stand is also available as an optional accessory for laboratory use.

4.2 Microprocessor Control

The K23060 incorporates an internal microcontroller that oversees and directly activates all system functions. This allows the more complex portions of the control program to be written in a high level language and then compiled into the machine code required for instrument operation.

4.3 Display

The instrument display presents four lines of parameter readings simultaneously for operator review, see Figure 1 to see an example showing User Name / Sample ID, Salt Concentration, Conductance and Temperature.

Figure 1. Main Display

The parameters are selected within the "Display Parameters" menu located in "Settings." Available display parameters include: User ID, Sample ID, Date, Time, Salt Concentration, Conductance (non-compensated), Conductance corrected to 25°C, pH, pH in mV, and Temperature. See the menu in Figure 2 below. If more data is selected use the down / up arrow to access them.

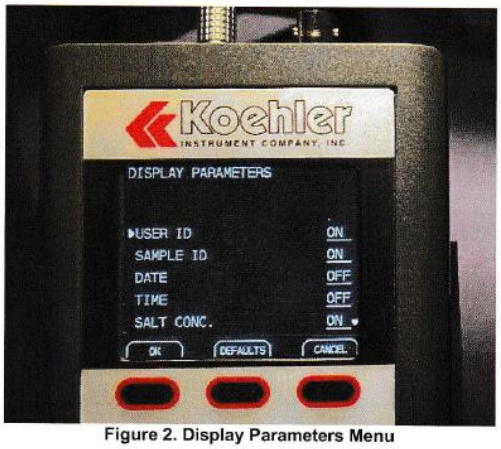

Figure 2. Display Parameters Menu

In the "Settings" menu the user can also set the Date and Time (Figure 3), select Measurement Units (Figure 4), and select the number of decimal places to be displayed (Figure 5). The measurement units of the temperature, conductance and salt concentration can be changed for user preference.

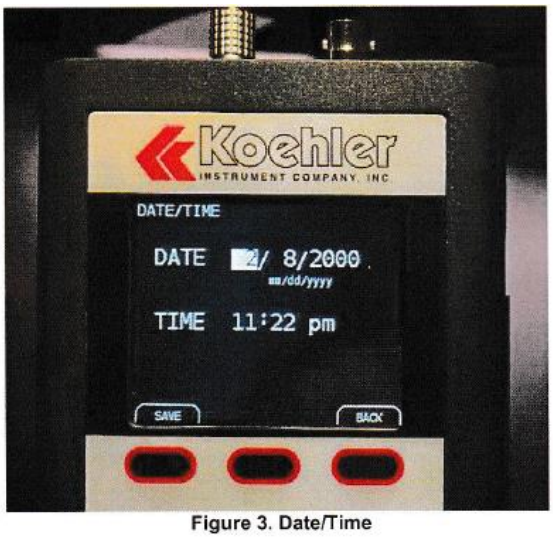

Figure 3. Date/Time

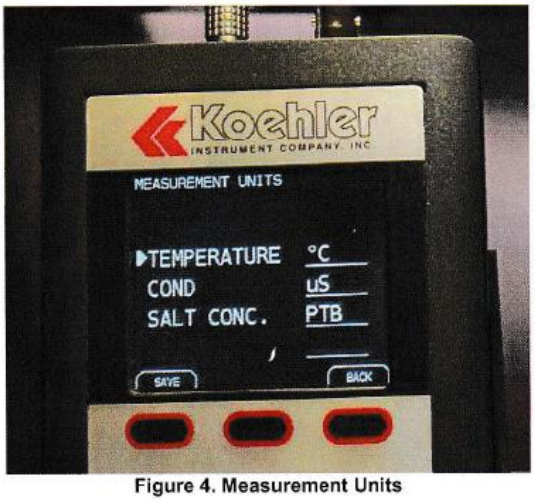

Figure 4. Measurement Units

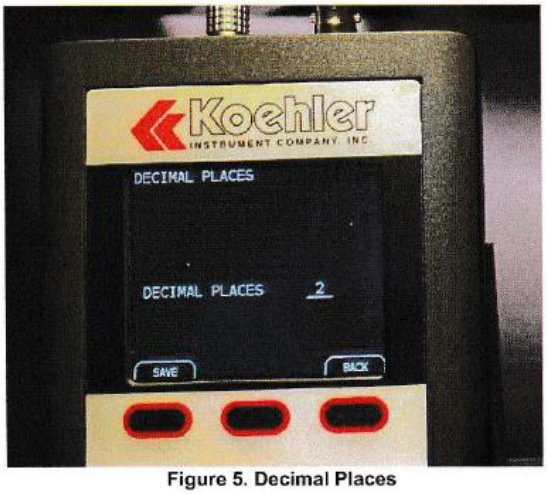

Figure 5. Decimal Places

4.4 Keypad

There are three soft buttons which change based on the screen you are in and there are 5 other buttons which are used for navigation. The center round button is the select button if the unit is on or it acts as an ON/OFF button if the unit is off.

4.5 Power Requirements

The K23060 has several power source options. The primary source for portable (short-term) field operation is the internal battery pack. The instrument has a built in battery charger for the internal battery. The internal battery is charged by plugging the external AC adapter into the Power connector on the side of the unit.

For continuous lab operation the instrument may be powered from an 115VAC source by plugging the external AC adapter into the Power connector.

The instrument maintains an auto-shutoff feature to prolong battery life when it is being used for intermittent measurements. This feature may be deselected in the setup menu. When the unit is operated from the internal batteries it has enough capacity for approximately eight hours of continuous operation.

4.6 pH Input

The pH channel of the instrument uses a low noise, ultra low input bias current instrumentation amplifier. It is configured as a differential input amplifier. The sensor to be used may be any combination pH electrode that will allow connection to the readout, BNC connector. The electrode should also have a temperature response that follows the "Nernst" equation, as this is the means used by the unit to temperature compensate the pH measurement.

The temperature value that is used during pH compensation is normally the measured temperature provided by the sensor in the conductance probe. During calibration the pH temperature may be input manually from the keypad or taken automatically from the conductance sensor.