Measurement Configuration - 7082 Dual Cell Conductivity

Cell Constant Mode

ATTENTION

When in the CELL CONST mode, a cell constant update (accomplished by pressing ENTER twice) will initialize the instrument, which removes all previously stored data from memory. This setting for both cells should therefore be made first in the calibration procedure.

Refer to directions provided with the cell to determine the cell constant. The value of the cell constant which is being used must be entered from the keyboard, as follows:

1. Press CELL CONST once for Cell 1 or twice for Cell 2 and the value of the cell constant (0.01, 0.1, 1, 10 , 25 or 50) is displayed. Note that a 1 or 2 will appear to identify the cell. Honeywell cell catalog numbers use the following cell constant = cell suffix designations; 0.01 = 001, 0.1 = 01, 1=1, 10=10, 25=25, 50=50.
2. Use the "up arrow" or "down arrow" keys to change the displayed value to one of these Step 1 selections. When the desired cell constant value is displayed, press ENTER. The display will flash as a warning. If you wish to exit without resetting the cell constant, press COND/RES/TEMP. To enter the displayed value of cell constant, press ENTER while the display is flashing. The instrument will store the cell constant, reset, and then return to the normal operating mode.
3. Repeat steps 1 and 2 for the other cell, if used.

Temperature Compensation Selection Mode

Standard Range Analyzers

Code	Solute
0	NaCl*
1	Acid (cation)/ammonia/ETA
2	Morpholine
3	TDS (NaCl)
4	TDS Acid (cation)/ammonia/ETA
5	TDS (morpholine)

Wide Range Analyzers

Code	Solute
0	NaCl*
1	HCl
2	NaOH
3	H2SO4
4	TDS (NaCl)
5	TDS (HCl)
6	TDS (NaOH)
7	TDS (HsSO4)

*Factory Setting

1. Press CELL CONST once for Cell 1 or twice for Cell 2. Then press CELL CONST and "down arrow" together. SET, OUTPUT and CAL are displayed along with cell number and the code for solute compensation.
2. Use the "down arrow" or "up arrow" keys to display the desired compensation code.
3. Press ENTER to store the value and return to normal operation.

4. Repeat Steps 1 through 3 for the other cell.

Lead Wire Resistance Compensation (Wide Range Analyzers Only)

When the resistance of the conductivity cell leads becomes significant with respect to the cell resistance (at high conductance values), it is desirable to compensate the measurement. For standard Honeywell cell lead lengths of 7 or 20 feet connected directly to the Analyzer, no compensation is necessary. If long leads are used (where resistance is > 0.5 ohms), the lead resistance may be compensated without calculation. If mixed wire gauges are used, see the Appendix before continuing.

1. Press CELL CONST, then press CELL CONST and OUTPUT LIMIT keys simultaneously. The display will show SET and the selected gauge number.
2. Use the "up arrow" or "down arrow" key to display the desired choice of wire gauge (18, 16, 14, or 12 A.W.G.) and press ENTER to store the value.

To Set Wire Length:

1. Press CELL CONST, then press CELL CONST and OUTPUT LIMIT simultaneously **twice**. The display will show SET 1 and the length of cable from cell to analyzer, in feet, for Cell 1.
2. Use the "up arrow" and "down arrow" keys to display the appropriate length, up to 1999 feet. (The 7082 Analyzer accounts for the fact that a **pair** of conductors this length is in the measuring circuit.) Press ENTER to store the value and return to normal operating mode.
3. Press CELL CONST, then press CELL CONST and OUTPUT LIMIT simultaneously **3 times**. The display will show SET 2 and the length of cable from cell to analyzer, in feet, for Cell 2.

Calibration

Cell Calibration Factor

Due to manufacturing tolerances, some variation in cell constant values of industrial conductivity cells is expected. To allow for correction of this variation, each Honeywell cell for use with Honeywell 7082 Analyzers is individually tested and marked with a cell calibration factor. For highest accuracy, this factor should be used. It may be entered from the 7082 Analyzer keyboard directly as follows:

1. Note the cell calibration factor marked on the cell.
2. From normal operating mode, press CELL CONST once for Cell 1 or twice for Cell 2. The value of the cell constant will appear on the display.
3. Press CELL CONST and "up arrow" keys simultaneously. The cell Calibration Factor, along with SET, CAL and numeral 1 or 2 indicators will be displayed.
4. Use the "up arrow " and "down arrow" keys to adjust the value on the display to the previously noted value marked on the cell.
5. Press ENTER to store this value and to return to normal operating mode. The cell calibration factor is stored and will be included by the instrument in subsequent calculations.

It should be noted that successful measurements depend upon selection, care and cleanliness of the conductivity cell. Always prepare cells in accordance with the instructions supplied with them, observing temperature, pressure and flow limitations. For most accurate temperature measurement and compensation, it is good practice to insulate the outer body of the cell so that process temperature measurement is less affected by ambient conditions.

Analyzer Verification with Check Resistance

Another use of the second input to the Two-Cell Analyzer is to measure a precision check resistor to verify complete Analyzer operation. This used to be done as an off-line instrument test to verify calibration. However, with the Two-Cell 7082, the check can be available at any time using only the display and keypad without interrupting the normal measurement, alarm action or output signal. To

verify instrument operation at any point of measurement, a check resistance is calculated from one of the following:

Conductivity check resistance (ohms) = (Cell Constant (cm^{-1}) x 10^6)/(Conductivity (microsiemens/cm))

Resistivity check resistance (ohms) = Cell Constant (cm^{-1}) x Resistivity (ohm-cm)

TDS check resistance (ohms) = (Cell Constant (cm^{-1}) x 10^6)/ (TDS (ppm)/TDS factor)

(TDS factor has units of ppm/microsiemens-cm^{-1})

In addition, an 8550 ohm resistor (Honeywell Part No. 233300) is installed in place of the temperature compensator to simulate 25° C, the reference temperature.

To match exact values, the Cell Calibration Factor must be set to 1.000 and the Nominal Calibration Trim must be performed if either was changed from factory settings.

Data for Concentration Range Measurements

Material/Weight % Concentration	Simulation Resistance (ohms) @ 25° C Cell Constant		
	10	25	50
Hydrochloric Acid (HCl)			
0		∞	∞
1		242.5	485.0
4		68.9	137.7
Sulfuric Acid (H2SO4)			
0	∞	∞	∞
1	215.5	538.7	1077.4
4	56.0	140.0	280.0
Sodium Chloride (NaCl)			
0	∞	∞	∞
1	574.1	1435.1	2870.3
4	195.2	398.0	796.1
Sodium Hydroxide (NaOH)			
0	∞	∞	∞
1	189.2	473.0	946.1
4	54.0	135.1	270.1