



# Keyboard Calibration

## Overview

The calibration process involves setting two points, minimum and maximum representing the input range of the variable. The internal A/D (Analog to Digital) converter in the unit converts an analog voltage to counts, either in the negative or positive direction. Note: You can switch the CDi to display either counts or translated values by pressing the "Version" key. Press "Version" again to toggle this function. The input range of the unit is from -1Volt to +1Volt, being internally represented from -30000 to +30000 counts respectively.

### Required tools

For temperature calibration you should have a thermometer. For pH, you will need two different buffer solutions, preferably pH 4.00 and pH 10.00. If pH 10.00 buffer is not available, use pH 7.00. For DO you should have 0.0ppm oxygen solution. If not, you can "short" pins 2 and 3 on the CPC connector to simulate zero. Do this only for DO channels.

### Important!

Always wait for the reading to stabilize before you accept the value indicated. The easiest way to do this is to switch the unit to "counts" display (press the "V" key) and wait until the reading is stable.

### Keyboard Calibration

In the graphic identify the following:

1. Gray colored row of keys - these add 1000, 100, 10, 1, 0.1, 0.01 to the displayed value (F=+1000, K=+0.01)
2. Green colored row of keys - these subtract 1000,100, 10, 1, 0.1, 0.01 from the displayed value (L=-1000, Q=-0.01)
3. Arrow keys
4. Cal Min and Cal Max keys
5. ENTER key
6. ESCAPE key

					ESCAPE
Alarms	Battery	Reset	-	Erase Memory	SHIFT
A	B	C	D	E	
Contrast		+	7	8	9
F	G	H	I	J	K
Memory			4	5	6
L	M	N	PowerOff	O	P
Reset	Set	Time	1	2	3
R	S	T	U	Version	V
	Cal Min	Cal Max	←	0 →	ENTER
X	Y	Z			

## DO Calibration

Calibration of DO channels requires familiarity with DO probe air calibration procedures. Fresh water saturation data is given in the table, at the end of this chapter. Look up the ambient temperature and match with the pressure column. At sea level and 21 degrees C, the DO value is 8.9 mg/L. In this example we calibrate DO channel 4, assuming a DO saturation value of 8.9 mg/L.

### To calibrate the minimum (zero) for a DO channel proceed as follows:

- Short the input (pins 2&3) on CPC connector for channel 4 with a shorting block.
- Press the Cal Min key, then left or right arrow keys to navigate to the channel you want to calibrate (channel 4 in this example). If the indicated value is not 0.00, use the keys in the gray row to add, or the keys in the green row to subtract.
- Press the ENTER key to accept or ESCAPE to exit. Remove the shorting block and replace the original CPC connector.

```
Press <Enter> at
+0000.00 [ PPM]
Input Channel [4]
DO (Min)
```

### To calibrate the maximum for a DO channel proceed as follows:

- Assuming you intend to calibrate the maximum for DO channel 4, fix the probe from channel 4 about 1cm above the water surface and allow about an hour for temperature equalization.
- Wait for the readings to stabilize. You may wish to switch the unit to "counts" display by pressing the V-Version key. Watch the reading (4th line on the left) change. Do not proceed to the next step until the reading has stabilized.
- Press the Cal Max key, then left or right arrow keys to navigate to the channel you want to calibrate (channel 4 in this example). If the indicated value is not 8.90, use the keys in the gray row to add, or the keys in the green row to subtract.
- Press the ENTER key to accept or ESCAPE to exit.

```
Press <Enter> at
+0008.90 [ PPM]
Input Channel [4]
DO (Max)
```



## Keyboard Calibration

### pH Calibration

Calibration of pH channels requires buffer of pH 4.00 and 10.00. If buffer pH 10.00 is not available, use buffer pH 7.00. For best temperature response both buffers should be at a temperature close to that of the water. Future CDi software will auto-compensate for temperature.

#### To calibrate the minimum for a pH channel proceed as follows:

- Assuming you intend to calibrate the minimum for pH channel 2, expose the pH probe from channel 2 to pH 4.00 buffer.
- Wait for the readings to stabilize. You may wish to switch the unit to "counts" display by pressing the V-Version key. Watch the reading (2nd line on the left) change. Do not proceed to the next step until the reading has stabilized.
- Press the Cal Min key, then left or right arrow keys to navigate to the channel you want to calibrate (channel 2 in this example). If the indicated value is not 4.00, use the keys in the gray row to add, or the keys in the green row to subtract.

```
Press <Enter> at
+0004.00 [ pH]
Input Channel [2]
pH (Min)
```

#### To calibrate the maximum for a pH channel proceed as follows:

- Assuming you intend to calibrate the maximum for pH channel 2, expose the pH probe from channel 2 to pH 10.00 buffer.
- Wait for the readings to stabilize. You may wish to switch the unit to "counts" display by pressing the V-Version key. Watch the reading (2nd line on the left) change. Do not proceed to the next step until the reading has stabilized.
- Press the Cal Max key, then left or right arrow keys to navigate to the channel you want to calibrate (channel 2 in this example). If the indicated value is not 10.00, use the keys in the gray row to add, or the keys in the green row to subtract.
- Press the ENTER key to accept or ESCAPE to exit.

```
Press <Enter> at
+0010.00 [ pH]
Input Channel [2]
pH (Max)
```

### Temperature Calibration

Calibration of temperature channels requires the use of a thermometer to verify actual temperature.

#### To calibrate the minimum for a temperature channel proceed as follows:

- Assuming you intend to calibrate channel 1, expose the temperature probe from channel 1 to a low temperature (some ice in a bucket of water will do).
- Wait for the readings to stabilize. You may wish to switch the unit to "counts" display by pressing the V-Version key. Watch the reading (1st line on the left) change. Do not proceed to the next step until the reading has stabilized. Monitor the temperature with the thermometer.
- Press the Cal Min key, then left or right arrow keys to navigate to the channel you want to calibrate (channel 1 in this example). If the indicated value is not the same as the temperature indicated on the thermometer, use the keys in the gray row to add, or the keys in the green row to subtract.
- Press the ENTER key to accept or ESCAPE to exit.

```
Press <Enter> at
+0000.00 [DegC]
Input Channel [1]
Temp (Min)
```

#### To calibrate the maximum for a temperature channel proceed as follows:

- Assuming you intend to calibrate channel 1, expose the temperature probe from channel 1 to a high temperature (place probe in usual position in tank. ~30 degrees C).
- Wait for the readings to stabilize. You may wish to switch the unit to "counts" display by pressing the V-Version key. Watch the reading (1st line on the left) change. Do not proceed to the next step until the reading has stabilized. Monitor the temperature with the thermometer.
- Press the Cal Max key, then left or right arrow keys to navigate to the channel you want to calibrate (channel 1 in this example). If the indicated value is not the same as the temperature indicated on the thermometer, use the keys in the gray row to add, or the keys in the green row to subtract.

```
Press <Enter> at
+0030.00 [DegC]
Input Channel [1]
Temp (Max)
```



## Keyboard Calibration

### Dissolved Oxygen in Fresh Water

<b>Meters</b>	0	152	305	457	610	762	914	1067	1219	1372	1524	1676	1829
<b>mg Hg</b>	760	747	733	721	708	695	683	671	659	648	636	625	614
<b>mbar</b>	1013	995	978	961	944	927	911	895	879	863	848	833	819

C	F													
0	32.00	14.60	14.34	14.09	13.84	13.60	13.36	13.12	12.89	12.67	12.44	12.22	12.01	11.80
1	33.80	14.20	13.95	13.70	13.46	13.22	12.99	12.76	12.54	12.32	12.10	11.89	11.68	11.47
2	35.60	13.81	13.57	13.33	13.10	12.87	12.64	12.42	12.20	11.98	11.77	11.56	11.36	11.16
3	37.40	13.45	13.21	12.98	12.75	12.52	12.30	12.09	11.87	11.66	11.46	11.28	11.06	10.86
4	39.20	13.09	12.86	12.64	12.41	12.20	11.98	11.77	11.56	11.36	11.16	10.96	10.77	10.58
5	41.00	12.76	12.53	12.31	12.09	11.88	11.67	11.47	11.26	11.07	10.87	10.68	10.49	10.31
6	42.80	12.44	12.22	12.00	11.79	11.58	11.38	11.18	10.98	10.79	10.60	10.41	10.23	10.05
7	44.60	12.13	11.91	11.70	11.50	11.29	11.10	10.90	10.71	10.52	10.33	10.15	9.97	9.80
8	46.40	11.83	11.62	11.42	11.22	11.02	10.83	10.63	10.45	10.26	10.08	9.91	9.73	9.56
9	48.20	11.55	11.34	11.15	10.95	10.76	10.57	10.38	10.20	10.02	9.84	9.67	9.50	9.33
10	50.00	11.28	11.08	10.88	10.69	10.50	10.32	10.14	9.96	9.78	9.61	9.44	9.27	9.11
11	51.80	11.02	10.82	10.63	10.44	10.26	10.08	9.90	9.73	9.56	9.39	9.22	9.06	8.90
12	53.60	10.77	10.58	10.39	10.21	10.03	9.85	9.68	9.51	9.34	9.17	9.01	8.85	8.70
13	55.40	10.53	10.34	10.16	9.98	9.80	9.63	9.46	9.29	9.13	8.97	8.81	8.66	8.50
14	57.20	10.29	10.11	9.93	9.76	9.59	9.42	9.25	9.09	8.93	8.77	8.62	8.47	8.32
15	59.00	10.07	9.89	9.72	9.55	9.38	9.22	9.05	8.89	8.74	8.58	8.43	8.28	8.14
16	60.80	9.86	9.68	9.51	9.35	9.18	9.02	8.86	8.70	8.55	8.40	8.25	8.11	7.96
17	62.60	9.65	9.48	9.31	9.15	8.99	8.83	8.68	8.52	8.37	8.22	8.08	7.94	7.80
18	64.40	9.45	9.29	9.12	8.96	8.80	8.65	8.50	8.35	8.20	8.06	7.91	7.77	7.64
19	66.20	9.26	9.10	8.94	8.78	8.63	8.47	8.32	8.18	8.03	7.89	7.75	7.62	7.48
20	68.00	9.08	8.92	8.76	8.61	8.45	8.30	8.16	8.01	7.87	7.73	7.60	7.46	7.33
21	69.80	8.90	8.74	8.59	8.44	8.29	8.14	8.00	7.86	7.72	7.58	7.45	7.32	7.19
22	71.60	8.73	8.57	8.42	8.27	8.13	7.98	7.84	7.71	7.57	7.44	7.31	7.18	7.05
23	73.40	8.56	8.41	8.26	8.12	7.97	7.83	7.69	7.56	7.43	7.29	7.17	7.04	6.92
24	75.20	8.40	8.25	8.11	7.96	7.82	7.69	7.55	7.42	7.29	7.16	7.03	6.91	6.79
25	77.00	8.24	8.10	7.96	7.82	7.68	7.54	7.41	7.28	7.15	7.03	6.90	6.78	6.66
26	78.80	8.09	7.95	7.81	7.67	7.54	7.41	7.28	7.15	7.02	6.90	6.78	6.66	6.54
27	80.60	7.95	7.81	7.67	7.54	7.40	7.27	7.14	7.02	6.90	6.77	6.65	6.54	6.42
28	82.40	7.81	7.67	7.53	7.40	7.27	7.14	7.02	6.89	6.77	6.65	6.54	6.42	6.31
29	84.20	7.67	7.54	7.40	7.27	7.14	7.02	6.90	6.77	6.65	6.54	6.42	6.31	6.20
30	86.00	7.54	7.41	7.28	7.15	7.02	6.90	6.78	6.66	6.54	6.42	6.31	6.20	6.09
31	87.80	7.41	7.28	7.15	7.03	6.90	6.78	6.66	6.54	6.43	6.32	6.20	6.09	5.99
32	89.60	7.29	7.16	7.03	6.91	6.79	6.67	6.55	6.43	6.32	6.21	6.10	5.99	5.89
33	91.40	7.17	7.04	6.92	6.79	6.67	6.56	6.44	6.33	6.22	6.11	6.00	5.89	5.79
34	93.20	7.05	6.92	6.80	6.68	6.56	6.45	6.34	6.22	6.11	6.01	5.90	5.80	5.69
35	95.00	6.93	6.81	6.69	6.57	6.46	6.34	6.23	6.12	6.02	5.91	5.81	5.70	5.60
36	96.80	6.82	6.70	6.59	6.47	6.36	6.24	6.13	6.03	5.92	5.82	5.71	5.61	5.51
37	98.60	6.72	6.60	6.48	6.37	6.26	6.15	6.04	5.93	5.83	5.72	5.62	5.52	5.43
38	100.40	6.61	6.49	6.38	6.27	6.16	6.05	5.94	5.84	5.74	5.63	5.53	5.44	5.34
39	102.20	6.51	6.39	6.28	6.17	6.06	5.96	5.85	5.75	5.65	5.55	5.45	5.35	5.26
40	104.00	6.41	6.30	6.19	6.08	5.97	5.86	5.76	5.66	5.56	5.46	5.37	5.27	5.18