

HOW DO I SETUP THE DUALPRO TO MEASURE PERCENT OXYGEN?

The Dualpro can be setup to control or monitor percent O₂ by changing the following settings and parameters;

1. Remove the instrument display panel and locate the DIP switches on the interface board (second from the right).
2. On the 8 position DIP switch on the interface board, turn position 1 OFF, position 2 ON, and all other positions to OFF. This will set CV0 and CV2 to percent oxygen.
3. Replace the display panel.
4. Press the SETUP key and then continue to press the LEFT or RIGHT key until CALC appears in the lower display
5. Press the ENTER key until parameter O2EX appears in the upper display. This parameter sets the oxygen exponent.
6. Change the lower display to 2 by pressing the UP or DOWN keys. This will display oxygen in percent. If this parameter is set to 6, oxygen is displayed in part per million.
7. Press the ENTER key again to display parameter O2DP. This sets the number of digits that are displayed to the right of the decimal point.
8. Change the lower display to 2 by pressing the UP or DOWN keys.
9. Press the ENTER key until CALC is displayed.
10. Press the RIGHT or LEFT key until CON is displayed.
11. Press the ENTER key to verify that the control variable of either loop 1 or loop 2 is set to CV0. This will be with CV1 or CV2 in the upper display and CV0 selected for either loop. This assignment is based on the control contracts or analog output assignments used in your system.
12. Press the SETUP key to return to the process screens. The percent oxygen will then be displayed in the selected loop's process screen.

To verify the process data, press the PAGE DISP key and select the DATA screen using the LEFT or RIGHT keys. View analog data inputs by pressing the DOWN key. IN A is usually the probe thermocouple. IN B is usually the probe millivolts, IN C is usually a temperature control thermocouple. CV0 and CV2 will display the percent oxygen.

Compare the temperature on IN A and the millivolts on IN B to the attached chart. The oxygen reading on the chart should agree with the reading on the instrument's process display.

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Oxygen Chart

Deg C	1125	1150	1175	1200	1225	1250	1275	1300
Deg F	2057	2102	2147	2192	2237	2282	2327	2372
MV								
0	20.95%	20.95%	20.95%	20.95%	20.95%	20.95%	20.95%	20.95%
5	17.74%	17.79%	17.84%	17.89%	17.94%	17.98%	18.03%	18.07%
10	15.02%	15.11%	15.19%	15.28%	15.36%	15.44%	15.51%	15.59%
15	12.72%	12.83%	12.94%	13.05%	13.15%	13.25%	13.35%	13.45%
20	10.77%	10.90%	11.02%	11.14%	11.26%	11.37%	11.49%	11.60%
25	9.12%	9.25%	9.39%	9.51%	9.64%	9.76%	9.89%	10.00%
30	7.72%	7.86%	7.99%	8.13%	8.25%	8.38%	8.51%	8.63%
35	6.54%	6.67%	6.81%	6.94%	7.07%	7.19%	7.32%	7.44%
40	5.54%	5.67%	5.80%	5.93%	6.05%	6.18%	6.30%	6.42%
45	4.69%	4.81%	4.94%	5.06%	5.18%	5.30%	5.42%	5.54%
50	3.97%	4.09%	4.20%	4.32%	4.44%	4.55%	4.66%	4.78%
55	3.36%	3.47%	3.58%	3.69%	3.80%	3.91%	4.01%	4.12%
60	2.85%	2.95%	3.05%	3.15%	3.25%	3.35%	3.45%	3.55%
65	2.41%	2.50%	2.60%	2.69%	2.78%	2.88%	2.97%	3.07%
70	2.04%	2.13%	2.21%	2.30%	2.38%	2.47%	2.56%	2.64%
75	1.73%	1.81%	1.88%	1.96%	2.04%	2.12%	2.20%	2.28%
80	1.46%	1.53%	1.60%	1.68%	1.75%	1.82%	1.89%	1.97%
85	1.24%	1.30%	1.37%	1.43%	1.50%	1.56%	1.63%	1.70%
90	1.05%	1.11%	1.16%	1.22%	1.28%	1.34%	1.40%	1.46%
95	0.89%	0.94%	0.99%	1.04%	1.10%	1.15%	1.21%	1.26%
100	0.75%	0.80%	0.84%	0.89%	0.94%	0.99%	1.04%	1.09%
105	0.64%	0.68%	0.72%	0.76%	0.80%	0.85%	0.89%	0.94%
110	0.54%	0.58%	0.61%	0.65%	0.69%	0.73%	0.77%	0.81%
115	0.46%	0.49%	0.52%	0.56%	0.59%	0.63%	0.66%	0.70%
120	0.39%	0.41%	0.44%	0.47%	0.50%	0.54%	0.57%	0.60%
125	0.33%	0.35%	0.38%	0.40%	0.43%	0.46%	0.49%	0.52%
130	0.28%	0.30%	0.32%	0.35%	0.37%	0.40%	0.42%	0.45%
135	0.23%	0.25%	0.27%	0.30%	0.32%	0.34%	0.36%	0.39%
140	0.20%	0.22%	0.23%	0.25%	0.27%	0.29%	0.31%	0.33%
145	0.17%	0.18%	0.20%	0.22%	0.23%	0.25%	0.27%	0.29%
150	0.14%	0.16%	0.17%	0.18%	0.20%	0.21%	0.23%	0.25%
155	0.12%	0.13%	0.14%	0.16%	0.17%	0.18%	0.20%	0.21%
160	0.10%	0.11%	0.12%	0.13%	0.15%	0.16%	0.17%	0.18%
165	0.09%	0.10%	0.10%	0.11%	0.12%	0.14%	0.15%	0.16%
170	0.07%	0.08%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%
175	0.06%	0.07%	0.08%	0.08%	0.09%	0.10%	0.11%	0.12%
180	0.05%	0.06%	0.06%	0.07%	0.08%	0.09%	0.09%	0.10%
185	0.04%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.09%
190	0.04%	0.04%	0.05%	0.05%	0.06%	0.06%	0.07%	0.08%
195	0.03%	0.04%	0.04%	0.04%	0.05%	0.05%	0.06%	0.07%
200	0.03%	0.03%	0.03%	0.04%	0.04%	0.05%	0.05%	0.06%

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Oxygen Chart

Deg C	1125	1150	1175	1200	1225	1250	1275	1300
Deg F	2057	2102	2147	2192	2237	2282	2327	2372
MV								
205	2.29E-04	2.58E-04	2.90E-04	3.24E-04	3.61E-04	4.00E-04	4.43E-04	4.89E-04
210	1.94E-04	2.19E-04	2.47E-04	2.76E-04	3.09E-04	3.44E-04	3.81E-04	4.21E-04
215	1.64E-04	1.86E-04	2.10E-04	2.36E-04	2.64E-04	2.95E-04	3.28E-04	3.64E-04
220	1.39E-04	1.58E-04	1.79E-04	2.02E-04	2.26E-04	2.53E-04	2.82E-04	3.14E-04
225	1.18E-04	1.34E-04	1.52E-04	1.72E-04	1.94E-04	2.17E-04	2.43E-04	2.70E-04
230	9.96E-05	1.14E-04	1.30E-04	1.47E-04	1.66E-04	1.87E-04	2.09E-04	2.33E-04
235	8.43E-05	9.68E-05	1.10E-04	1.26E-04	1.42E-04	1.60E-04	1.80E-04	2.01E-04
240	7.14E-05	8.22E-05	9.41E-05	1.07E-04	1.22E-04	1.38E-04	1.55E-04	1.74E-04
245	6.05E-05	6.98E-05	8.01E-05	9.16E-05	1.04E-04	1.18E-04	1.33E-04	1.50E-04
250	5.12E-05	5.93E-05	6.82E-05	7.82E-05	8.92E-05	1.01E-04	1.15E-04	1.29E-04
255	4.34E-05	5.03E-05	5.81E-05	6.68E-05	7.64E-05	8.70E-05	9.86E-05	1.11E-04
260	3.67E-05	4.27E-05	4.95E-05	5.70E-05	6.54E-05	7.47E-05	8.49E-05	9.61E-05
265	3.11E-05	3.63E-05	4.21E-05	4.87E-05	5.60E-05	6.41E-05	7.30E-05	8.29E-05
270	2.63E-05	3.08E-05	3.59E-05	4.16E-05	4.79E-05	5.50E-05	6.29E-05	7.15E-05
275	2.23E-05	2.62E-05	3.06E-05	3.55E-05	4.11E-05	4.72E-05	5.41E-05	6.17E-05
280	1.89E-05	2.22E-05	2.60E-05	3.03E-05	3.51E-05	4.05E-05	4.65E-05	5.32E-05
285	1.60E-05	1.89E-05	2.22E-05	2.59E-05	3.01E-05	3.48E-05	4.00E-05	4.59E-05
290	1.35E-05	1.60E-05	1.89E-05	2.21E-05	2.58E-05	2.99E-05	3.45E-05	3.96E-05
295	1.15E-05	1.36E-05	1.61E-05	1.89E-05	2.21E-05	2.56E-05	2.97E-05	3.41E-05
300	9.70E-06	1.16E-05	1.37E-05	1.61E-05	1.89E-05	2.20E-05	2.55E-05	2.95E-05
305	8.22E-06	9.82E-06	1.17E-05	1.38E-05	1.62E-05	1.89E-05	2.20E-05	2.54E-05
310	6.96E-06	8.34E-06	9.93E-06	1.18E-05	1.38E-05	1.62E-05	1.89E-05	2.19E-05
315	5.89E-06	7.08E-06	8.46E-06	1.00E-05	1.19E-05	1.39E-05	1.63E-05	1.89E-05
320	4.99E-06	6.01E-06	7.20E-06	8.58E-06	1.02E-05	1.20E-05	1.40E-05	1.63E-05
325	4.22E-06	5.11E-06	6.14E-06	7.32E-06	8.69E-06	1.03E-05	1.20E-05	1.41E-05
330	3.58E-06	4.34E-06	5.23E-06	6.26E-06	7.44E-06	8.81E-06	1.04E-05	1.21E-05
335	3.03E-06	3.68E-06	4.45E-06	5.34E-06	6.37E-06	7.56E-06	8.92E-06	1.05E-05
340	2.56E-06	3.13E-06	3.79E-06	4.56E-06	5.46E-06	6.49E-06	7.67E-06	9.03E-06
345	2.17E-06	2.66E-06	3.23E-06	3.90E-06	4.67E-06	5.57E-06	6.60E-06	7.79E-06
350	1.84E-06	2.26E-06	2.75E-06	3.33E-06	4.00E-06	4.78E-06	5.68E-06	6.72E-06
355	1.56E-06	1.92E-06	2.34E-06	2.84E-06	3.43E-06	4.10E-06	4.89E-06	5.79E-06
360	1.32E-06	1.63E-06	1.99E-06	2.43E-06	2.93E-06	3.52E-06	4.21E-06	5.00E-06
365	1.12E-06	1.38E-06	1.70E-06	2.07E-06	2.51E-06	3.02E-06	3.62E-06	4.31E-06
370	9.45E-07	1.17E-06	1.45E-06	1.77E-06	2.15E-06	2.60E-06	3.12E-06	3.72E-06
375	8.01E-07	9.97E-07	1.23E-06	1.51E-06	1.84E-06	2.23E-06	2.68E-06	3.21E-06
380	6.78E-07	8.46E-07	1.05E-06	1.29E-06	1.58E-06	1.91E-06	2.31E-06	2.77E-06
385	5.74E-07	7.19E-07	8.93E-07	1.10E-06	1.35E-06	1.64E-06	1.99E-06	2.39E-06
390	4.86E-07	6.10E-07	7.61E-07	9.41E-07	1.16E-06	1.41E-06	1.71E-06	2.06E-06
395	4.12E-07	5.18E-07	6.48E-07	8.03E-07	9.89E-07	1.21E-06	1.47E-06	1.78E-06
400	3.48E-07	4.40E-07	5.52E-07	6.86E-07	8.47E-07	1.04E-06	1.27E-06	1.53E-06
405	2.95E-07	3.74E-07	4.70E-07	5.86E-07	7.25E-07	8.92E-07	1.09E-06	1.32E-06

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Oxygen Chart

Deg C	1125	1150	1175	1200	1225	1250	1275	1300
Deg F	2057	2102	2147	2192	2237	2282	2327	2372
MV								
410	2.50E-07	3.18E-07	4.00E-07	5.00E-07	6.21E-07	7.65E-07	9.37E-07	1.14E-06
415	2.12E-07	2.70E-07	3.41E-07	4.27E-07	5.32E-07	6.57E-07	8.06E-07	9.83E-07
420	1.79E-07	2.29E-07	2.90E-07	3.65E-07	4.55E-07	5.64E-07	6.94E-07	8.48E-07
425	1.52E-07	1.94E-07	2.47E-07	3.12E-07	3.90E-07	4.84E-07	5.97E-07	7.31E-07
430	1.28E-07	1.65E-07	2.11E-07	2.66E-07	3.34E-07	4.16E-07	5.14E-07	6.31E-07
435	1.09E-07	1.40E-07	1.79E-07	2.27E-07	2.86E-07	3.57E-07	4.42E-07	5.44E-07
440	9.21E-08	1.19E-07	1.53E-07	1.94E-07	2.45E-07	3.06E-07	3.80E-07	4.69E-07
445	7.80E-08	1.01E-07	1.30E-07	1.66E-07	2.10E-07	2.63E-07	3.27E-07	4.05E-07
450	6.60E-08	8.59E-08	1.11E-07	1.42E-07	1.79E-07	2.26E-07	2.82E-07	3.49E-07
455	5.59E-08	7.30E-08	9.43E-08	1.21E-07	1.54E-07	1.94E-07	2.42E-07	3.01E-07
460	4.74E-08	6.20E-08	8.03E-08	1.03E-07	1.32E-07	1.66E-07	2.09E-07	2.60E-07
465	4.01E-08	5.26E-08	6.84E-08	8.81E-08	1.13E-07	1.43E-07	1.79E-07	2.24E-07
470	3.40E-08	4.47E-08	5.83E-08	7.53E-08	9.64E-08	1.22E-07	1.54E-07	1.93E-07
475	2.87E-08	3.79E-08	4.96E-08	6.43E-08	8.25E-08	1.05E-07	1.33E-07	1.67E-07
480	2.43E-08	3.22E-08	4.23E-08	5.49E-08	7.07E-08	9.03E-08	1.14E-07	1.44E-07
485	2.06E-08	2.74E-08	3.60E-08	4.69E-08	6.05E-08	7.75E-08	9.84E-08	1.24E-07
490	1.75E-08	2.32E-08	3.06E-08	4.00E-08	5.18E-08	6.65E-08	8.47E-08	1.07E-07
495	1.48E-08	1.97E-08	2.61E-08	3.42E-08	4.44E-08	5.71E-08	7.29E-08	9.23E-08
500	1.25E-08	1.68E-08	2.22E-08	2.92E-08	3.80E-08	4.90E-08	6.27E-08	7.96E-08
505	1.06E-08	1.42E-08	1.89E-08	2.49E-08	3.25E-08	4.21E-08	5.40E-08	6.87E-08
510	8.97E-09	1.21E-08	1.61E-08	2.13E-08	2.78E-08	3.61E-08	4.64E-08	5.92E-08
515	7.60E-09	1.03E-08	1.37E-08	1.82E-08	2.38E-08	3.10E-08	4.00E-08	5.11E-08
520	6.43E-09	8.72E-09	1.17E-08	1.55E-08	2.04E-08	2.66E-08	3.44E-08	4.41E-08
525	5.45E-09	7.40E-09	9.96E-09	1.33E-08	1.75E-08	2.28E-08	2.96E-08	3.80E-08
530	4.61E-09	6.29E-09	8.48E-09	1.13E-08	1.50E-08	1.96E-08	2.55E-08	3.28E-08
535	3.91E-09	5.34E-09	7.22E-09	9.67E-09	1.28E-08	1.68E-08	2.19E-08	2.83E-08
540	3.31E-09	4.54E-09	6.15E-09	8.26E-09	1.10E-08	1.44E-08	1.89E-08	2.44E-08
545	2.80E-09	3.85E-09	5.24E-09	7.05E-09	9.39E-09	1.24E-08	1.62E-08	2.10E-08
550	2.37E-09	3.27E-09	4.46E-09	6.02E-09	8.04E-09	1.06E-08	1.40E-08	1.82E-08
555	2.01E-09	2.78E-09	3.80E-09	5.14E-09	6.89E-09	9.14E-09	1.20E-08	1.57E-08
560	1.70E-09	2.36E-09	3.24E-09	4.39E-09	5.90E-09	7.84E-09	1.03E-08	1.35E-08
565	1.44E-09	2.00E-09	2.76E-09	3.75E-09	5.05E-09	6.73E-09	8.90E-09	1.17E-08
570	1.22E-09	1.70E-09	2.35E-09	3.20E-09	4.32E-09	5.78E-09	7.66E-09	1.01E-08
575	1.03E-09	1.44E-09	2.00E-09	2.73E-09	3.70E-09	4.96E-09	6.59E-09	8.67E-09
580	8.74E-10	1.23E-09	1.70E-09	2.33E-09	3.17E-09	4.26E-09	5.67E-09	7.48E-09
585	7.40E-10	1.04E-09	1.45E-09	1.99E-09	2.71E-09	3.66E-09	4.88E-09	6.45E-09
590	6.27E-10	8.85E-10	1.23E-09	1.70E-09	2.32E-09	3.14E-09	4.20E-09	5.56E-09
595	5.31E-10	7.52E-10	1.05E-09	1.45E-09	1.99E-09	2.69E-09	3.61E-09	4.80E-09
600	4.49E-10	6.38E-10	8.95E-10	1.24E-09	1.70E-09	2.31E-09	3.11E-09	4.14E-09
605	3.81E-10	5.42E-10	7.63E-10	1.06E-09	1.46E-09	1.99E-09	2.68E-09	3.57E-09
610	3.22E-10	4.60E-10	6.49E-10	9.06E-10	1.25E-09	1.70E-09	2.30E-09	3.08E-09