S&S™

NORTHERN

CO2X - Carbon Numbers

Carbon Dioxide & Temperature Monitor

799
Average
889
22.8 °C

S&S
NORTHERN

✓ CO_2 measured and displayed in parts per million (PPM).
✓ Temperature can be displayed in degrees Celsius (°C) or Fahrenheit (°F).
✓ 0-10V Signal Output progress bar display.
✓ Monitor, record and display average CO_2 concentration over 8 hour periods.
✓ User friendly settings menu.
✓ Pre-alarm and alarm relay output.
✓ Fan controller enabled relay output.
✓ Dual power input 100-240vac or 12-24v ac or dc.
✓ End of Life notification for CO_2 sensing element.
✓ Automatically switch between ventilation programs when gas is used.
✓ Boost, Mute and Wake Up feature.

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📖 Installation, Operation & Maintenance

Please read this manual carefully and retain for future use.

The Merlin CO2-X is designed to monitor carbon dioxide (CO_2) in the air and temperature.

The monitor has a digital traffic light style display indicating the carbon dioxide levels and temperature in the area.

When CO_2 gas or temperature reaches alarm state – this device is able to automatically drive ventilation reducing CO_2 and/or temperature.

⚠ *The information contained within this manual should be referenced for typical installation and operation only.*
⚠ *For specific requirements that may deviate from the information in this manual – contact your supplier.*

Content

⚠

Important Warning Statements

Please take the time to thoroughly read this user's guide which should be retained for future reference.

The expected lifetime of the gas sensor elements is 10 years upon initial power up.

The device will display a message to indicate its end of life and should immediately be replaced.

It is recommended that this device be commissioned upon installation and serviced annually.

Do not apply lighter gas or other aerosols to the device – this will cause extreme damage.

High concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements.

This device is designed to monitor carbon dioxide gas and temperature only. It is NOT designed to detect smoke, fire or other gases and should NOT be used as such.

Never ignore your device when in alarm.

This device requires a continual supply of electrical power – it will not work without power.

This device should not be used to substitute proper installation, use and/or maintenance of fuel burning appliances including appropriate ventilation and exhaust systems.

This device does not prevent dangerous gasses from occurring or accumulating.

Actuation of your alarm indicates the presence of dangerous levels of CO_2 or high temperature.

This unit may not fully safeguard individuals with specific medical conditions. If in doubt, consult a doctor/physician.

Your product should reach you in perfect condition, if you suspect it is damaged, contact your supplier.

Manufacturer's Warranty

Warranty coverage: The manufacturer warrants to the original consumer purchaser, that this product will be free of defects in material and workmanship for a period of three (3) years from date of purchase.

The manufacturer's liability hereunder is limited to replacement of the product with repaired product at the discretion of the manufacturer. This warranty is void if the product has been damaged by accident, unreasonable use, neglect, tampering or other causes not arising from defects in material or workmanship. This warranty extends to the original consumer purchaser of the product only. **Warranty disclaimers:** Any implied warranties arising out of this sale, including but not limited to the implied warranties of description, merchantability and intended operational purpose, are limited in duration to the above warranty period. In no event shall the manufacturer be liable for loss of use of this product or for any indirect, special, incidental or consequential damages, or costs, or expenses incurred by the consumer or any other user of this product, whether due to a breach of contract, negligence, strict liability in tort or otherwise. The manufacturer shall have no liability for any personal injury, property damage or any special, incidental, contingent or consequential damage of any kind resulting from gas leakage, fire or explosion. This warranty does not affect your statutory rights. **Warranty Performance**: During the above warranty period, your product will be replaced with a comparable product if the defective product is returned together with proof of purchase date. The replacement product will be in warranty for the remainder of the original warranty period or for six months – whichever is the greatest.

Information on waste disposal for consumers of electrical & electronic equipment.

When this product has reached the end of its life, it must be treated as Waste Electrical & Electronics Equipment (WEEE). Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. Please contact your supplier or local authority for details of recycling schemes in your area.

Alternatively, S&S Northern products can be securely packaged and returned clearly marked for disposal.

Installation

Typical Location & Positioning

Consider the coverage required and function of the area. Emphasis should be placed on airflow patterns and correct placement, not perceived detecting ranges. The target gas will only be identified when contact is made with the sensing element itself. Your monitor should be installed in populated areas that risk high concentrations of CO_2 gas or varied temperatures e.g. educational and government buildings including laboratories and commercial kitchens.

Take in to account the design of the airflow within the zone area. Avoid conditions such as; condensation; vibration; extreme temperatures and draft zones. Avoid conditions of any other environmental factors that could potentially impede the accuracy and operation of the detectors such as; condensation; vibration; extreme temperatures, pressure, presence of other gases, electromagnetic interference and draft zones. Avoid positioning near draft areas (windows and door entrances). Where possible, monitors must be fixed in such a position as to allow natural air circulation. These recommended heights may vary based on airflow and temperature conditions in addition to the proposed application and location.

Laboratories/educational buildings: Seated head height
Commercial kitchens: 1700mm (5.6ft) from ground level

⚠ **Multiple monitors may be required to adequately protect property and/or persons!**

Access & Mounting

The monitors are designed for surface mounting and must be installed by a licensed, insured contractor or competent person. A deeper back enclosure is supplied to accommodate wiring where required.

Carefully remove the rear cover from the unit by releasing the two latching clips located at the bottom of the case. To do this – use a small flat head screwdriver.
Using the rear cover - mark the screw holes to the wall and ensure the wall surface is flat to prevent base distortion. There are two pre-fractured areas for cable entry provided on the inside of the rear cover, which may be cut away as required. After executing the mounting and the connections – replace the rear cover ensuring the two clips are latched. Make a note of the installation date on the label located on the side of the unit.

Board Overview
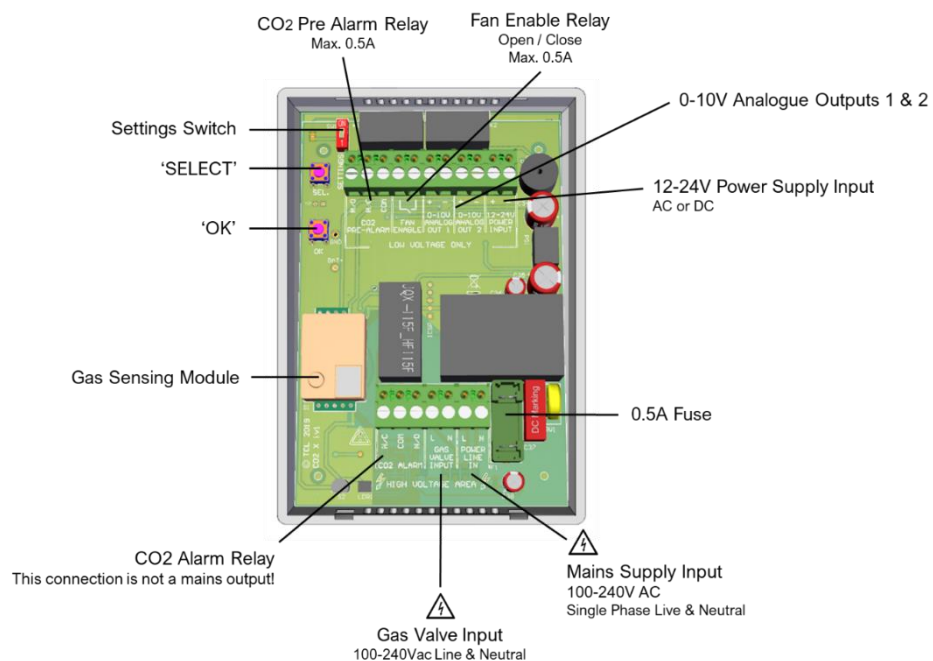
Wiring your CO2-X
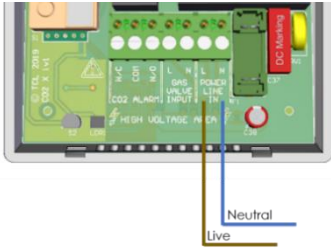
MAINS POWER/LINE IN
(100-240vac option)
Single-phase mains power is supplied to the [POWER/LINE IN] connector.
LIVE & NEUTRAL ONLY.

GAS VALVE INPUT

It is possible for your CO2-X to receive a signal from a gas solenoid valve via Live & Neutral terminals on our merlin panels when wired parallel. To receive a signal you must ensure that you configure the CO2X to Natural or Mechanical ventilation mode – *see settings for ventilation types.*
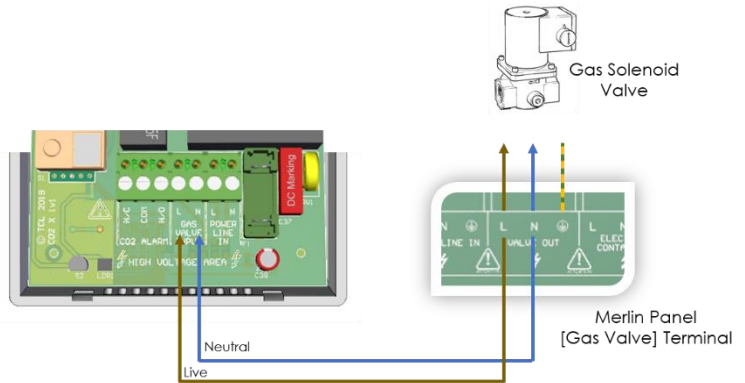
When gas is supplied/in use – the CO2X will receive a signal from the gas valve and display the [GAS IN USE] message. The CO2X will configure itself automatically to operate in 'Kitchen' mode until the gas supply is turned off – see 'Settings' for configuration.

⚠️
Recommended for teaching areas with gas appliances such as laboratories and food technology rooms.
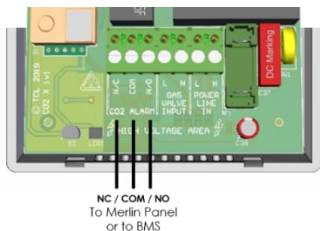
CO2 ALARM (Not a mains output)
This terminal can also connect to a building management system (BMS) or to a Merlin panel to send an alarm signal upon alarm levels of CO_2. This terminal can also switch the Live (energise/ de-energise) a gas valve upon alarm levels of carbon dioxide.
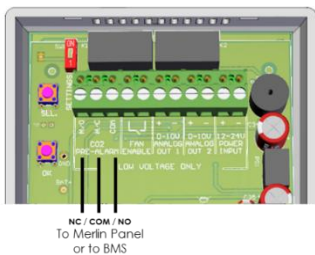
CO2 PRE-ALARM
This relay can send a signal to a Building Management System (BMS) or Merlin panel when CO2 reaches pre-alarm level.
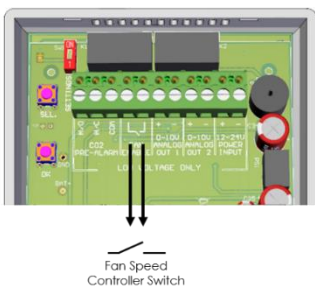
FAN ENABLE
This relay output can be connected to a fan switch which can energise fans via a signal. This relay will switch on a fan from the current CO_2 level only, by current temperature only or by the status of both (whichever is greatest) as follows: **N/C: >600ppm / >23°C (73.4°F) N/O: <550ppm / <22°C (71.6°F)**
These levels cannot be altered.
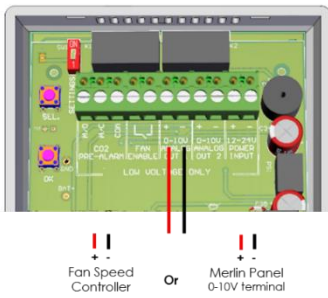
0-10V ANALOGUE OUTPUT 1 & OUTPUT 2

These connections are used to regulate external fan speed controllers (supplied separately). Connect direct to fan speed controllers or via your Merlin panel [0-10V] terminal if available. Minimum voltage output can be configured in settings menu from zero to 5 volts.

0-10V output can be driven by the status of current CO_2 level only, by current temperature only or by the status of both levels (whichever is greatest).
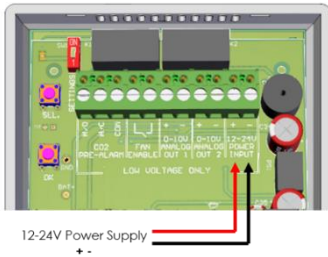
12-24V (AC or DC) POWER

To power the CO2X with 12-24v power – this should be supplied to the [12-24V POWER INPUT] connector (+ / -).

This connection can be either AC or DC.

Configuration Settings

There is a settings switch on the CO2-X board. Switch it on to prompt the on-screen menu. Navigate the menu using the buttons on the board. When changes have been made – turn the settings switch off.

[SEL.] button
- Scroll through functions (highlighted red).
- Change the desired setting when highlighted.

[OK] button
- Highlights setting (red).
- Press to save desired setting.

Configuration

NAT. - Natural Ventilation Mode (Recommended for buildings without mechanical ventilation). DEFAULT

Pre Alarm: ≥1300ppm >23 °C/ 73.4°F	**0-10V Analogue Output: Linear Progression.**
Alarm: ≥1500ppm >25 °C/ 77.0°F	CO2 from 400-5000 ppm
CO_2 Pre-alarm relay switch: 1300ppm	Temperature from 0-50°C
CO_2 Alarm relay switch: 1500ppm	**Boost** from: 400 - 1499ppm 0°C/32°F – 26.9°C/ 80.4°F

MECH. - Mechanical Ventilation Mode (Recommended for buildings with mechanical ventilation).

Pre Alarm: ≥800ppm >23 °C/ 73.4°F	**0-10V Analogue Output: Linear Progression.**
Alarm: ≥1000ppm >25 °C/ 77.0°F	CO2 from 400-5000 ppm
CO_2 Pre-alarm relay switch: 800ppm	Temperature from 0-50°C
CO_2 Alarm relay switch: 1000ppm	**Boost** from: 400 - 999ppm 0°C/32°F – 26.9°C/ 80.4°F

KITCH. – Kitchen/Gas in Use Ventilation Mode (Recommended for kitchen environments).

Pre Alarm: ≥1500ppm >23 °C/ 73.4°F	**0-10V Analogue Output: Linear Progression.**
Alarm: ≥2800ppm >25 °C/ 77.0°F	CO2 from 400-5000 ppm
CO_2 Pre-alarm relay switch: 2800ppm	Temperature from 0-50°C
CO_2 Alarm relay switch: 4500ppm	**Boost** from: 400 - 2799ppm 0°C/32°F – 26.9°C/ 80.4°F
	Buzzer / Mute from: >2800ppm

MIN 0-10 OUT 1
Analogue output minimum voltage.
Select: **0, 1, 2, 3, 4, 5** volt/s

MIN 0-10 OUT 2
Analogue output minimum voltage.
Select: **0, 1, 2, 3, 4, 5** volt/s

0-10V OUT 1
0-10V analogue output energised by.
Select: **CO2 / TEMPERATURE / DUAL**

0-10V OUT 2
0-10V analogue output energised by.
Select: **CO2 / TEMPERATURE / DUAL**

BUZZER
Kitchen Vent Type Mode
CO_2 >2800ppm Only. Select:
ON – 3 beeps every 15 seconds
10MINS – 3 beeps every 10 minutes
OFF

TEMP. UNITS
Temperature measurement
Select: **°C** Celsius **/ °F** Fahrenheit

BOOST (MIN.)
Analogue outputs at optimum voltage
(10V) for number of minutes. Boost can be activated only if analogue outputs are set to either CO2 or DUAL mode only.
Select: **1, 2, 3, 4, 5, 6, 7, 8, 9, 10** minute/s

FAN ENABLE
Fan switch is energised by. Select:
CO2 (ON >600ppm   OFF <550ppm)
TEMPERATURE (ON >23°C OFF <22°C)
DUAL (Whichever is greatest)

BRIGHTNESS
Brightness of the screen display. Select:
LOW / MEDIUM / HIGH

SCREEN SAVER
ON – screen will switch off until temperature or CO_2 levels reach pre alarm/ alarm status.
OFF – screen constantly on.

TEMP. ADJUSTMENT
Adjust the temperature display by up to ± 5°C or 9°F in increments of **0.1°**

FACTORY RESET
Return to default condition.
YES / NO

Factory Set Condition

VENT. TYPE	NAT.	BUZZER	ON	SCREEN SAVER	OFF
MIN 0-10 OUT 1	0	TEMP. UNITS	°C	TEMP. ADJUSTMENT	0.0°C/F
MIN 0-10 OUT 2	0	BOOST (MIN.)	1		
0-10V OUT 1	TEMP	FAN ENABLE	CO2		
0-10V OUT 2	CO2	BRIGHTNESS	MED	FACTORY RESET	

0-10V Linear Scaling Table

Min. 0-10 Out 1,2 = 0
± 5% @ 20°C

	CO2		Temperature °C				CO2		Temperature °C	
Steps	ppm	V (DC)	t	V (DC)		**Steps**	ppm	V (DC)	t	V (DC)
0	400	0	0	0		**11**	598.429	0.43135	2.15688	0.43135
1	418.039	0.03921	0.19608	0.03921		**12**	616.468	0.47057	2.35296	0.47057
2	436.078	0.07843	0.39216	0.07843		**13**	634.507	0.50978	2.54904	0.50978
3	454.117	0.11764	0.58824	0.11764		**14**	652.546	0.549	2.74512	0.549
4	472.156	0.15686	0.78432	0.15686		**15**	670.585	0.58821	2.9412	0.58821
5	490.195	0.19607	0.9804	0.19607		**16**	688.624	0.62742	3.13728	0.62742
6	508.234	0.23528	1.17648	0.23528		**17**	706.663	0.66664	3.33336	0.66664
7	526.273	0.2745	1.37256	0.2745		**18**	724.702	0.70585	3.52944	0.70585
8	544.312	0.31371	1.56864	0.31371		**19**	742.741	0.74507	3.72552	0.74507
9	562.351	0.35293	1.76472	0.35293		**20**	760.78	0.78428	3.9216	0.78428
10	580.39	0.39214	1.9608	0.39214		**21**	778.819	0.82349	4.11768	0.82349

	CO2		Temperature °C		Steps	CO2		Temperature °C	
Steps	ppm	V (DC)	t	V (DC)		ppm	V (DC)	t	V (DC)
22	796.858	0.86271	4.31376	0.86271	71	1680.77	2.78419	13.9217	2.78419
23	814.897	0.90192	4.50984	0.90192	72	1698.81	2.82341	14.1178	2.82341
24	832.936	0.94114	4.70592	0.94114	73	1716.85	2.86262	14.3138	2.86262
25	850.975	0.98035	4.902	0.98035	74	1734.89	2.90184	14.5099	2.90184
26	869.014	1.01956	5.09808	1.01956	75	1752.93	2.94105	14.706	2.94105
27	887.053	1.05878	5.29416	1.05878	76	1770.96	2.98026	14.9021	2.98026
28	905.092	1.09799	5.49024	1.09799	77	1789	3.01948	15.0982	3.01948
29	923.131	1.13721	5.68632	1.13721	78	1807.04	3.05869	15.2942	3.05869
30	941.17	1.17642	5.8824	1.17642	79	1825.08	3.09791	15.4903	3.09791
31	959.209	1.21563	6.07848	1.21563	80	1843.12	3.13712	15.6864	3.13712
32	977.248	1.25485	6.27456	1.25485	81	1861.16	3.17633	15.8825	3.17633
33	995.287	1.29406	6.47064	1.29406	82	1879.2	3.21555	16.0786	3.21555
34	1013.33	1.33328	6.66672	1.33328	83	1897.24	3.25476	16.2746	3.25476
35	1031.37	1.37249	6.8628	1.37249	84	1915.28	3.29398	16.4707	3.29398
36	1049.4	1.4117	7.05888	1.4117	85	1933.32	3.33319	16.6668	3.33319
37	1067.44	1.45092	7.25496	1.45092	86	1951.35	3.3724	16.8629	3.3724
38	1085.48	1.49013	7.45104	1.49013	87	1969.39	3.41162	17.059	3.41162
39	1103.52	1.52935	7.64712	1.52935	88	1987.43	3.45083	17.255	3.45083
40	1121.56	1.56856	7.8432	1.56856	89	2005.47	3.49005	17.4511	3.49005
41	1139.6	1.60777	8.03928	1.60777	90	2023.51	3.52926	17.6472	3.52926
42	1157.64	1.64699	8.23536	1.64699	91	2041.55	3.56847	17.8433	3.56847
43	1175.68	1.6862	8.43144	1.6862	92	2059.59	3.60769	18.0394	3.60769
44	1193.72	1.72542	8.62752	1.72542	93	2077.63	3.6469	18.2354	3.6469
45	1211.76	1.76463	8.8236	1.76463	94	2095.67	3.68612	18.4315	3.68612
46	1229.79	1.80384	9.01968	1.80384	95	2113.71	3.72533	18.6276	3.72533
47	1247.83	1.84306	9.21576	1.84306	96	2131.74	3.76454	18.8237	3.76454
48	1265.87	1.88227	9.41184	1.88227	97	2149.78	3.80376	19.0198	3.80376
49	1283.91	1.92149	9.60792	1.92149	98	2167.82	3.84297	19.2158	3.84297
50	1301.95	1.9607	9.804	1.9607	99	2185.86	3.88219	19.4119	3.88219
51	1319.99	1.99991	10.0001	1.99991	100	2203.9	3.9214	19.608	3.9214
52	1338.03	2.03913	10.1962	2.03913	101	2221.94	3.96061	19.8041	3.96061
53	1356.07	2.07834	10.3922	2.07834	102	2239.98	3.99983	20.0002	3.99983
54	1374.11	2.11756	10.5883	2.11756	103	2258.02	4.03904	20.1962	4.03904
55	1392.15	2.15677	10.7844	2.15677	104	2276.06	4.07826	20.3923	4.07826
56	1410.18	2.19598	10.9805	2.19598	105	2294.1	4.11747	20.5884	4.11747
57	1428.22	2.2352	11.1766	2.2352	106	2312.13	4.15668	20.7845	4.15668
58	1446.26	2.27441	11.3726	2.27441	107	2330.17	4.1959	20.9806	4.1959
59	1464.3	2.31363	11.5687	2.31363	108	2348.21	4.23511	21.1766	4.23511
60	1482.34	2.35284	11.7648	2.35284	109	2366.25	4.27433	21.3727	4.27433
61	1500.38	2.39205	11.9609	2.39205	110	2384.29	4.31354	21.5688	4.31354
62	1518.42	2.43127	12.157	2.43127	111	2402.33	4.35275	21.7649	4.35275
63	1536.46	2.47048	12.353	2.47048	112	2420.37	4.39197	21.961	4.39197
64	1554.5	2.5097	12.5491	2.5097	113	2438.41	4.43118	22.157	4.43118
65	1572.54	2.54891	12.7452	2.54891	114	2456.45	4.4704	22.3531	4.4704
66	1590.57	2.58812	12.9413	2.58812	115	2474.49	4.50961	22.5492	4.50961
67	1608.61	2.62734	13.1374	2.62734	116	2492.52	4.54882	22.7453	4.54882
68	1626.65	2.66655	13.3334	2.66655	117	2510.56	4.58804	22.9414	4.58804
69	1644.69	2.70577	13.5295	2.70577	118	2528.6	4.62725	23.1374	4.62725
70	1662.73	2.74498	13.7256	2.74498	119	2546.64	4.66647	23.3335	4.66647
71	1680.77	2.78419	13.9217	2.78419	120	2564.68	4.70568	23.5296	4.70568
72	1698.81	2.82341	14.1178	2.82341	121	2582.72	4.74489	23.7257	4.74489
73	1716.85	2.86262	14.3138	2.86262	122	2600.76	4.78411	23.9218	4.78411
74	1734.89	2.90184	14.5099	2.90184	123	2618.8	4.82332	24.1178	4.82332
75	1752.93	2.94105	14.706	2.94105	124	2636.84	4.86254	24.3139	4.86254
76	1770.96	2.98026	14.9021	2.98026	125	2654.88	4.90175	24.51	4.90175
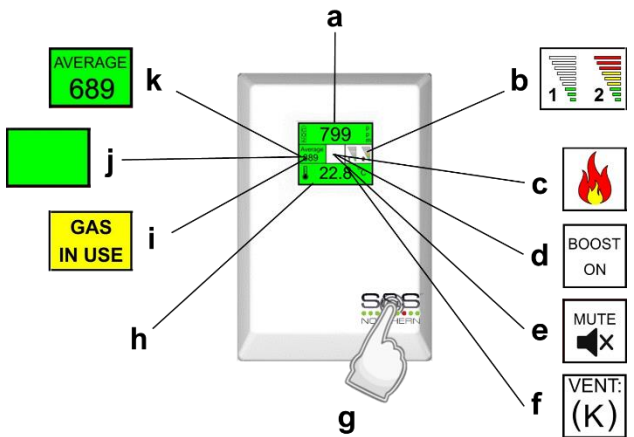
Steps	CO2 ppm	CO2 V (DC)	Temperature °C t	Temperature °C V (DC)	Steps	CO2 ppm	CO2 V (DC)	Temperature °C t	Temperature °C V (DC)
126	2672.91	4.94096	24.7061	4.94096	181	3665.06	7.09773	35.4905	7.09773
127	2690.95	4.98018	24.9022	4.98018	182	3683.1	7.13695	35.6866	7.13695
128	2708.99	5.01939	25.0982	5.01939	183	3701.14	7.17616	35.8826	7.17616
129	2727.03	5.05861	25.2943	5.05861	184	3719.18	7.21538	36.0787	7.21538
130	2745.07	5.09782	25.4904	5.09782	185	3737.22	7.25459	36.2748	7.25459
131	2763.11	5.13703	25.6865	5.13703	186	3755.25	7.2938	36.4709	7.2938
132	2781.15	5.17625	25.8826	5.17625	187	3773.29	7.33302	36.667	7.33302
133	2799.19	5.21546	26.0786	5.21546	188	3791.33	7.37223	36.863	7.37223
134	2817.23	5.25468	26.2747	5.25468	189	3809.37	7.41145	37.0591	7.41145
135	2835.27	5.29389	26.4708	5.29389	190	3827.41	7.45066	37.2552	7.45066
136	2853.3	5.3331	26.6669	5.3331	191	3845.45	7.48987	37.4513	7.48987
137	2871.34	5.37232	26.863	5.37232	192	3863.49	7.52909	37.6474	7.52909
138	2889.38	5.41153	27.059	5.41153	193	3881.53	7.5683	37.8434	7.5683
139	2907.42	5.45075	27.2551	5.45075	194	3899.57	7.60752	38.0395	7.60752
140	2925.46	5.48996	27.4512	5.48996	195	3917.61	7.64673	38.2356	7.64673
141	2943.5	5.52917	27.6473	5.52917	196	3935.64	7.68594	38.4317	7.68594
142	2961.54	5.56839	27.8434	5.56839	197	3953.68	7.72516	38.6278	7.72516
143	2979.58	5.6076	28.0394	5.6076	198	3971.72	7.76437	38.8238	7.76437
144	2997.62	5.64682	28.2355	5.64682	199	3989.76	7.80359	39.0199	7.80359
145	3015.66	5.68603	28.4316	5.68603	200	4007.8	7.8428	39.216	7.8428
146	3033.69	5.72524	28.6277	5.72524	201	4025.84	7.88201	39.4121	7.88201
147	3051.73	5.76446	28.8238	5.76446	202	4043.88	7.92123	39.6082	7.92123
148	3069.77	5.80367	29.0198	5.80367	203	4061.92	7.96044	39.8042	7.96044
149	3087.81	5.84289	29.2159	5.84289	204	4079.96	7.99966	40.0003	7.99966
150	3105.85	5.8821	29.412	5.8821	205	4098	8.03887	40.1964	8.03887
151	3123.89	5.92131	29.6081	5.92131	206	4116.03	8.07808	40.3925	8.07808
152	3141.93	5.96053	29.8042	5.96053	207	4134.07	8.1173	40.5886	8.1173
153	3159.97	5.99974	30.0002	5.99974	208	4152.11	8.15651	40.7846	8.15651
154	3178.01	6.03896	30.1963	6.03896	209	4170.15	8.19573	40.9807	8.19573
155	3196.05	6.07817	30.3924	6.07817	210	4188.19	8.23494	41.1768	8.23494
156	3214.08	6.11738	30.5885	6.11738	211	4206.23	8.27415	41.3729	8.27415
157	3232.12	6.1566	30.7846	6.1566	212	4224.27	8.31337	41.569	8.31337
158	3250.16	6.19581	30.9806	6.19581	213	4242.31	8.35258	41.765	8.35258
159	3268.2	6.23503	31.1767	6.23503	214	4260.35	8.3918	41.9611	8.3918
160	3286.24	6.27424	31.3728	6.27424	215	4278.39	8.43101	42.1572	8.43101
161	3304.28	6.31345	31.5689	6.31345	216	4296.42	8.47022	42.3533	8.47022
162	3322.32	6.35267	31.765	6.35267	217	4314.46	8.50944	42.5494	8.50944
163	3340.36	6.39188	31.961	6.39188	218	4332.5	8.54865	42.7454	8.54865
164	3358.4	6.4311	32.1571	6.4311	219	4350.54	8.58787	42.9415	8.58787
165	3376.44	6.47031	32.3532	6.47031	220	4368.58	8.62708	43.1376	8.62708
166	3394.47	6.50952	32.5493	6.50952	221	4386.62	8.66629	43.3337	8.66629
167	3412.51	6.54874	32.7454	6.54874	222	4404.66	8.70551	43.5298	8.70551
168	3430.55	6.58795	32.9414	6.58795	223	4422.7	8.74472	43.7258	8.74472
169	3448.59	6.62717	33.1375	6.62717	224	4440.74	8.78394	43.9219	8.78394
170	3466.63	6.66638	33.3336	6.66638	225	4458.78	8.82315	44.118	8.82315
171	3484.67	6.70559	33.5297	6.70559	226	4476.81	8.86236	44.3141	8.86236
172	3502.71	6.74481	33.7258	6.74481	227	4494.85	8.90158	44.5102	8.90158
173	3520.75	6.78402	33.9218	6.78402	228	4512.89	8.94079	44.7062	8.94079
174	3538.79	6.82324	34.1179	6.82324	229	4530.93	8.98001	44.9023	8.98001
175	3556.83	6.86245	34.314	6.86245	230	4548.97	9.01922	45.0984	9.01922
176	3574.86	6.90166	34.5101	6.90166	231	4567.01	9.05843	45.2945	9.05843
177	3592.9	6.94088	34.7062	6.94088	232	4585.05	9.09765	45.4906	9.09765
178	3610.94	6.98009	34.9022	6.98009	233	4603.09	9.13686	45.6866	9.13686
179	3628.98	7.01931	35.0983	7.01931	234	4621.13	9.17608	45.8827	9.17608
180	3647.02	7.05852	35.2944	7.05852	235	4639.17	9.21529	46.0788	9.21529

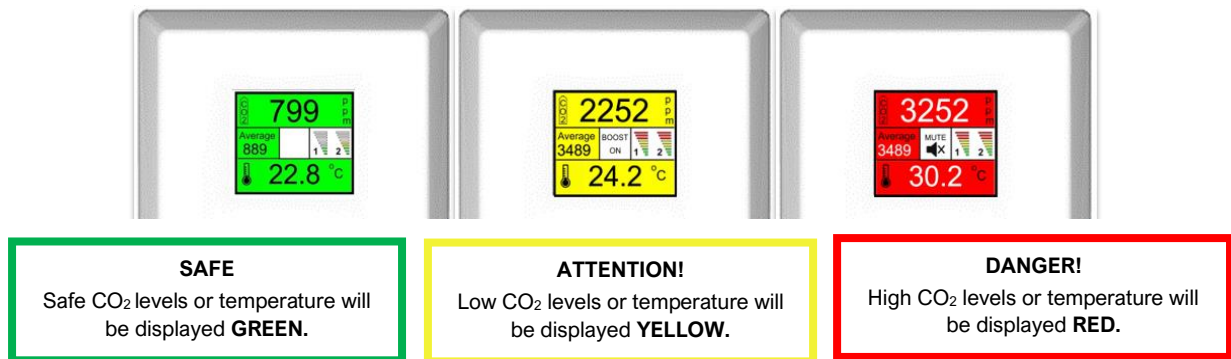| Steps	CO2		Temperature °C			Steps	CO2		Temperature °C	
	ppm	V (DC)	t	V (DC)			ppm	V (DC)	t	V (DC)
236	4657.2	9.2545	46.2749	9.2545		**246**	4837.59	9.64664	48.2357	9.64664
237	4675.24	9.29372	46.471	9.29372		**247**	4855.63	9.68586	48.4318	9.68586
238	4693.28	9.33293	46.667	9.33293		**248**	4873.67	9.72507	48.6278	9.72507
239	4711.32	9.37215	46.8631	9.37215		**249**	4891.71	9.76429	48.8239	9.76429
240	4729.36	9.41136	47.0592	9.41136		**250**	4909.75	9.8035	49.02	9.8035
241	4747.4	9.45057	47.2553	9.45057		**251**	4927.79	9.84271	49.2161	9.84271
242	4765.44	9.48979	47.4514	9.48979		**252**	4945.83	9.88193	49.4122	9.88193
243	4783.48	9.529	47.6474	9.529		**253**	4963.87	9.92114	49.6082	9.92114
244	4801.52	9.56822	47.8435	9.56822		**254**	4981.91	9.96036	49.8043	9.96036
245	4819.56	9.60743	48.0396	9.60743		**255**	4999.95	9.99957	50.0004	9.99957

Operation

Initial Power-Up & Indicators

On connecting power, the CO2-X monitor enters a stabilisation phase for approximately 60 seconds – during this period, your device not yet ready for operation.

a. CARBON DIOXIDE READING
Current CO_2 gas level in parts per million (ppm).

b. 0-10V ANALOGUE OUTPUT LEVEL
0-10V analogue outputs one and two.

c. FLAME ICON
Appears only when the CO2-X receives a signal from a gas valve and gas supply is open/on and set to Natural or Mechanical Ventilation Type mode.

d. BOOST ON
Message appears when BOOST is activated - press and hold the touch button (f) for three (3) seconds. The analogue outputs will run at optimum voltage (10V) for a pre-set number of minutes. Boost can only be activated if either analogue outputs is set to CO2 or DUAL mode only.

e. MUTE
Message appears when the touch button (f) is pressed. The audible alarm buzzer must be set to on or every 10 minutes and can only occur when gas is in use or KITCH. Ventilation mode is selected and when CO_2 levels rise above 2800ppm.

f. VENTILATION MODE
Displayed under normal operation. K (Kitchen) / M (Mechanical) / N (Natural). The mode determines the configuration and alarm levels.

g. TOUCH BUTTON
To activate Boost or Mute feature and to view the screen for 10 seconds during screen saver mode.

h. TEMPERATURE READING

i. GAS IN USE MESSAGE
Appears only when the CO2-X receives a signal from a gas valve and gas supply is open/on.
When the gas valve is closed, this message is not displayed.
Appears with Flame Icon.

j. BLANK – see K.
(Natural or Mechanical mode), this is left blank when the current CO_2 reading is below 550ppm.
In kitchen ventilation mode – this is constantly left blank.

k. AVERAGE CO$_2$
The monitor will display the average CO_2 reading over periods of 8 hours and appear only when current CO_2 levels reach or exceed 600ppm.
Natural or Mechanical ventilation type modes only.

Traffic Light Indicator

Your CO2-X displays both current CO_2 and temperature levels in a traffic light style indication.

SAFE	ATTENTION!	DANGER!
Safe CO_2 levels or temperature will be displayed **GREEN.**	Low CO_2 levels or temperature will be displayed **YELLOW.**	High CO_2 levels or temperature will be displayed **RED.**

Alarms & Configuration

NAT. - Natural Ventilation Mode **(N) DEFAULT**

Green: <1300ppm   <23 °C/ 73.4°F
Yellow: ≥1300ppm   >23 °C/ 73.4°F
Red: ≥1500ppm   >25 °C/ 77.0°F
CO₂ Pre-alarm relay switch: 1300ppm
CO₂ Alarm relay switch: 1500ppm

0-10V Analogue Output: Linear Progression.
CO2 from 400-5000 ppm
Temperature from 0-50°C
Boost from: 400 - 1499ppm   0°C/32°F – 26.9°C/80.4°F

MECH. - Mechanical Ventilation Mode **(M)**

Green: <800ppm   <23 °C/ 73.4°F
Yellow: ≥800ppm   >23 °C/ 73.4°F
Red: ≥1000ppm   >25 °C/ 77.0°F
CO₂ Pre-alarm relay switch: 800ppm
CO₂ Alarm relay switch: 1000ppm

0-10V Analogue Output: Linear Progression.
CO2 from 400-5000 ppm
Temperature from 0-50°C
Boost from: 400 - 999ppm   0°C/32°F – 26.9°C/80.4°F

KITCH. – Kitchen/Gas in Use Ventilation Mode **(K)**

Green: <1500ppm   <23 °C/ 73.4°F
Yellow: ≥1500ppm   >23 °C/ 73.4°F
Red: ≥2800ppm   >25 °C/ 77.0°F
CO₂ Pre-alarm relay switch: 2800ppm
CO₂ Alarm relay switch**:   4500ppm

0-10V Analogue Output: Linear Progression.
CO2 from 400-5000 ppm
Temperature from 0-50°C
Boost from: 400 - 2799ppm   0°C/32°F – 26.9°C/80.4°F
Buzzer alarm/ Mute from: >2800ppm

The alarm thresholds and configuration will depend on which ventilation mode your CO2X has been set.
There is no audio alarm for high temperatures.

Screen Saver Mode

If the screen saver mode is switched on (see settings), the CO2-X monitor screen will switch off when both CO_2 and Temperature levels are at safe levels (green). No readings or messages will be visible during this time. The screen will exit screen the saver mode when either the CO_2 or Temperature changes status (yellow or red).
To view the screen during this mode, press the touch button, the screen will be visible for 10 seconds.

End of Operational Life (EOL)

END OF LIFE   This message indicates that the CO2-X monitor has reached its expected operational lifecycle. No gas or temperature levels will be displayed. The expected lifetime is 10 years.

Contact your supplier and replace the unit immediately.
The expected lifecycle of 10 years may vary depending on environmental conditions.

General Maintenance

Cleaning

Keep your detector in good working order follow these basic principles.

- Carefully remove any accumulated dust from the outer enclosure using a slightly damp cloth.
- Never use detergents or solvents to clean your device – this may permenantly or temporarily damage the gas sensing elements.
- Never spray air fresheners, hair spray, paint or other aerosols near the device.
- Never paint the device. Paint will seal vents and interfere with the device.

⚠
High concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements – such as; wine; deodorants; stain removers; thinners etc.

Auto-Calibration

Our CO_2 sensors are designed to automatically recalibrate using background CO_2 levels ±100ppm.
For maintenance purposes, the device should be exposed to fresh air intermittently to aid with this process.
Inaccuracies that do not resolve over a 24-hour period may require temporary removal of the device, from site, for an extended exposure to fresh air.

Testing your CO2-X

The aim of the test is to make sure the CO2-X is working at its optimum by briefly exposing a level of carbon dioxide to send the device into an alarm state ensuring all system outputs/relays activate then it is working safely.
If the system fails to operate as intended in an alarm state, the device must not be used until a full inspection and service has been conducted.

To do this, simply breathe near or into the device. To increase reaction time, cover the escape vents.
If in doubt, contact your supplier.

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General Specification

General	
Product:	CO2X
Indicators (1.8" TFT Screen)	Green (Safe), Yellow (Special State) & Red (Alarm). Detected CO2 Level. Time Weighted Average CO2 Level (TWA). Temperature. Mute. Ventilation Boost Active. End of Life.
Screen Brightness	Low – Medium – High (Plus Screen Saver)
Mounting	Wall Mounting
Electrical	
Max. Power Consumption	2.16W
Power Voltage Input Range	100-240V AC 50-60Hz or 12-24V AC/ DC (Nominal 24V AC/DC Max)
Gas Valve Input	100–240vac
CO_2 Pre Alarm Relay Output	Max 0.5A Signal
CO_2 Alarm Relay	Max 3A @ 240V
Fan Enable Relay Output	Max 0.5A Signal
Terminal Wire ratings	Copper 18AWG (0.75mm2) Min. 14 x screw terminals.
Internal Fuse	0.5A / 250V AC
Construction	
Dimensions (H x W x D)	140 x 95 x 30mm / 5.51 x 3.74 x 1.18"
Unit Weight (Approx.)	0.08kg
Housing Material	ABS - PA765
Environmental	
Ingress Protection	IP40
Storage Conditions	Dry. Temp: -10 ~ 50°C / 14~ 122°F : 30 ~ 80% rh
Compliance	
CE / UKCA	BS EN 50270 / BS EN 61010-1
Temperature Sensor Specification	
Sensor Type	Linear Active Thermistor Integrated Circuit
Measuring Range	0-95 °C / 0-203°F
Accuracy @ 25°C / 77°F	± 2°C
Resolution	0.1 °C/°F
Carbon Dioxide Sensor Specification	
Factory Conditions	25° ± 5°C - 77° ± 41°F (40-70% RH)
Sensor Operating Temperature	-10C° ~ 50°C (14 ~ 122°F)
Sensor Operating Humidity	Continuous 30-80% rh Non-Condensing
Sensor Operating Pressure	Normal Atmospheric Pressure ± 10%

Gas Sensor	Indicating Range	Steps	Accuracy	Response (t90)	Ventilation	Alarm: 1 (Pre alarm relay)	Alarm: 2 (Latching relay)	*EOL (Years)
NDIR. Intelligent Infrared CO2 Module. ABC Logic Auto Calibration								
Carbon Dioxide (CO2)	400-5000ppm	1	-15%	<90s	Kitchen	▲2800ppm	▲4500ppm	10
					Natural	**▲1300ppm**	**▲1500ppm**	
					Mechanical	▲800ppm	▲1000ppm	

▲ Rising Alarm

*EOL – Expected Operational Life

Installation Details

Please pass this manual to the system owner / user.

Date of Installation:	
Installation Location:	
Organisation:	
Stamp/Signature of the installer:	

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S&S Northern Head Office

Tel: +44(0) 1257 470 983
Fax: +44(0) 1257 471 937
www.snsnorthern.com
info@snsnorthern.com

South East Division

Tel: +44(0) 1702 291 725
Fax: +44(0) 1702 299 148
south@snsnorthern.com