Technical Manual

Honeywell

Sensepoint XCD
Gas Detector

19 Cross Interference and Cross Calibration

19.1 Cross Interference Table for Toxic and Oxygen

This table shows the relative cross sensitivity of the Sensepoint XCD to other gases. “Gas Type” indicated the XCD sensor type fitted to the XCD. “Gas Type Applied” indicates the gas that may be applied to that sensor and the resulting Reading.

Gas type	Gas Type Applied	Concentration	Unit	Reading	Unit
O_2	Carbon Dioxide	5	%vol	0.1	%vol (change O_2 reading) per %vol CO_2
H_2S	Ammonia	50	ppm	0	ppm H_2S
	Carbon Monoxide	100	ppm	<2	ppm H_2S
	Carbon Dioxide	5000	ppm	0	ppm H_2S
	Chlorine	0.5	ppm	0	ppm H_2S
	Ethylene	100	ppm	0	ppm H_2S
	Hydrogen	100	ppm	0	ppm H_2S
	Hydrogen Sulfide	10	ppm	10	ppm H_2S
	Nitrogen Monoxide	25	ppm	0	ppm H_2S
	Nitrogen Dioxide	3	ppm	0	ppm H_2S
	Sulfur Dioxide	2	ppm	0	ppm H_2S
CO	Acetone	1000	ppm	0	ppm CO
	Acetylene	40	ppm	80	ppm CO
	Ammonia	100	ppm	0	ppm CO
	Carbon Monoxide	100	ppm	100	ppm CO
	Chlorine	2	ppm	0	ppm CO
	Ethanol	2000	ppm	3	ppm CO
	Ethylene	100	ppm	85	ppm CO
	Hydrogen	100	ppm	20	ppm CO
	Hydrogen	25	ppm	0	ppm CO
	Iso-Propanol	200	ppm	0	ppm CO
	Nitrogen Monoxide	50	ppm	8	ppm CO
	Nitrogen Dioxide	800	ppm	20	ppm CO
	Sulfur Dioxide	50	ppm	0.5	ppm CO
H_2	Carbon Monoxide	300	ppm	≤60	ppm H_2
	Hydrogen Sulfide	15	ppm	<3	ppm H_2
	Sulfur Dioxide	5	ppm	0	ppm H_2
	Nitrogen Monoxide	35	ppm	»10	ppm H_2
	Nitrogen Dioxide	5	ppm	0	ppm H_2
	Chlorine	1	ppm	0	ppm H_2
	Hydrogen Cyanide	10	ppm	»3	ppm H_2
	Hydrogen Chloride	5	ppm	0	ppm H_2
	Ethylene	100	ppm	»80	ppm H_2

19.2 Cross Calibration Flammable Gas Detector

For greater accuracy, a catalytic gas detector should be calibrated using a certified gas/air mixture equal to 50% LEL of the actual target gas intended to be monitored.

However, it is not always practical to obtain every detectable type of hydrocarbon gas in a calibration-ready, certified and verifiable form. Therefore, it is possible to carry out a “cross calibration” using another hydrocarbon gas/air mixture.

When the Sensepoint XCD Combustible LEL sensor is to be calibrated with a gas which is different to the gas or vapour to be detected, the following cross calibration procedure may be followed:

Caution: Where the user calibrates any sensor using a different gas, responsibility for identifying and recording calibration rests with the user. Refer to the local regulations where appropriate.

Notes:
1. Table 14 lists a selection of hydrocarbon compounds and states a reference figure or “Star Rating” according to the reaction they produce in relation to other hydrocarbons.
2. An eight star (8) gas produces the highest output, while a one star (1*) gas produces the lowest output.*

No.	Gas	Star Rating
1	Acetone	4*
2	Ammonia	7*
3	Benzene	3*
4	Butanone	3*
5	Butane	4*
6	Butyl acetate	1*
7	Butyl acrylate	1*
8	Cyclohexane	3*
9	Cyclohexanone	<1*
10	Diethyl ether	4*
11	Ethane	6*
12	Ethanol	5*
13	Ethyl acetate	3*
14	Ethylene	5*
15	Heptane	3*
16	Hexane	3*
17	Hydrogen	6*
18	Methane	6*
19	Methanol	5*
20	MIBK	3*
21	Octane	3*
22	Pentane	3*
23	Propane	5*
24	Propan-2-ol	4*
25	Styrene	2*

26	Tetra hydrafuran	4*
27	Toluene	3*
28	Triethylamine	3*
29	Xylene	2*

Table 14 . Star Rating of Gases

To cross calibrate the Sensepoint XCD flammable gas detector catalytic bead:
(1) Obtain the star rating for both the calibration test gas and the gas to be detected from Table 14
(2) These values may then be used in Table 15 to obtain the required calibration span setting when a 50% LEL test gas is applied to the detector.

*Rating of Calibration Gas	*Rating of Gas to be Detected							
	8*	7*	6*	5*	4*	3*	2*	1*
8*	50	62	76	95	-	-	-	-
7*	40	50	61	76	-	-	-	-
6*	33	41	50	62	78	-	-	-
5*	26	33	40	50	63	79	-	-
4*	-	26	32	40	50	63	80	-
3*	-	-	26	32	40	50	64	81
2*	-	-	-	25	31	39	50	64
1*	-	-	-	-	25	31	39	50

Note: These settings must only be used with a calibration gas concentration of 50% LEL.

Table 15. Calibration span setting

(3) If a sensor is to be used to detect a gas other than that for which it was calibrated and there is no intention to use an equivalent calibration gas to re-calibrate the sensor, then the required correction factor may be obtained from Table 16.

The reading shown on the gas detector controller or transmitter display should be multiplied by this number in order to obtain a more accurate gas concentration result.

Sensor calibrated to detect	Sensor used to detect							
	8*	7*	6*	5*	4*	3*	2*	1*
8*	1.00	1.24	1.52	1.89	2.37	2.98	3.78	4.83
7*	0.81	1.00	1.23	1.53	1.92	2.40	3.05	3.90
6*	0.66	0.81	1.00	1.24	1.56	1.96	2.49	3.17
5*	0.53	0.66	0.80	1.00	1.25	1.58	2.00	2.55
4*	0.42	0.52	0.54	0.80	1.00	1.26	1.60	2.03
3*	0.34	0.42	0.51	0.64	0.80	1.00	1.27	1.62
2*	0.26	0.33	0.40	0.50	0.63	0.79	1.00	1.28
1*	0.21	0.26	0.32	0.39	0.49	0.62	0.78	1.00

Table 16. Correction factors

Notes:
1. Since catalytic sensors require oxygen for correct operation, a mixture of gas in air should always be used for calibration purposes.
2. Assuming average performance of the sensor, the sensitivity information in Tables 14 To 16 is normally accurate to + or - 30%.

Working Example:
If the target gas to be detected is 0-100%LEL Ethylene and the only calibration gas available to re-calibrate the sensor is Methane (at 50% LEL concentration), the procedure is as follows:
(1) Look up the star rating for each gas in Table 14:

Gas No. 14, Ethylene = 5*
Gas No. 18, Methane = 6*

(2) Then, look up the span settings for a 50% LEL calibration gas in Table 15 by selecting the row of figures next to the 6* in the “calibration gas” column. Select the figure in the 5* column of the “gas to be detected” section. The figure is 62.

(3) This means that during re-calibration, the span gas setting on the gas detector transmitter or controller should be set to 62% LEL to give an accurate measuring scale for 0-100%LEL Ethylene, when using 50% LEL Methane as the calibration gas.

Section 19.2 is used for Sensepoint XCD Catalytic Sensor only, please refer to the Sensepoint Technical Manual for using Sensepoint flammable gas sensors.

Please contact your local Honeywell Analytics sales or service distributor, or regional office should further clarification or additional information be required.