

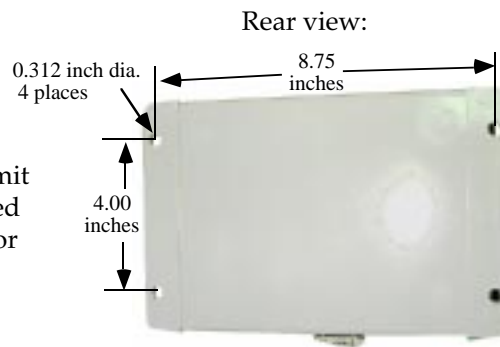
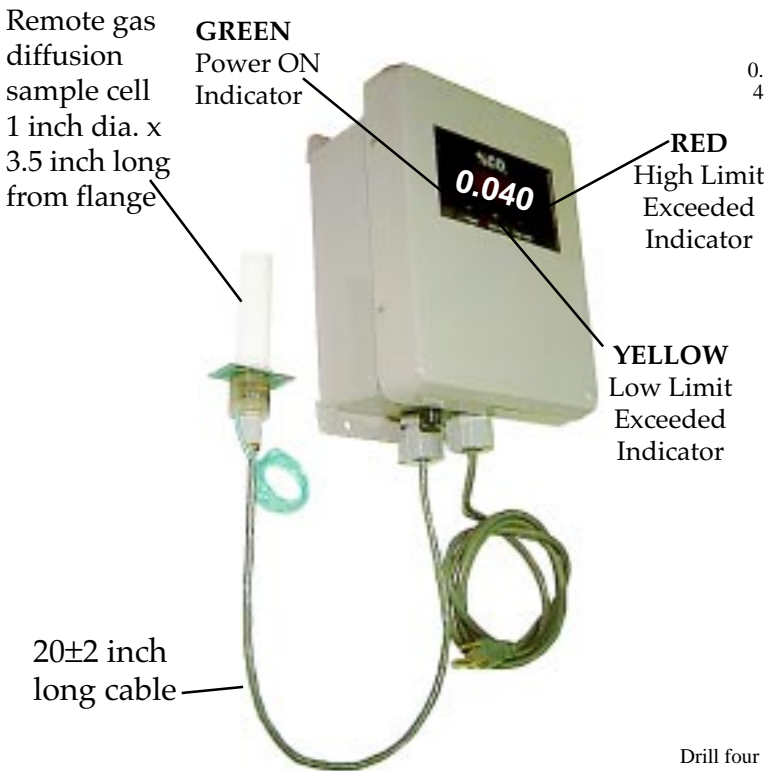


Carbon Dioxide Monitor Model 2156-R 1.0%

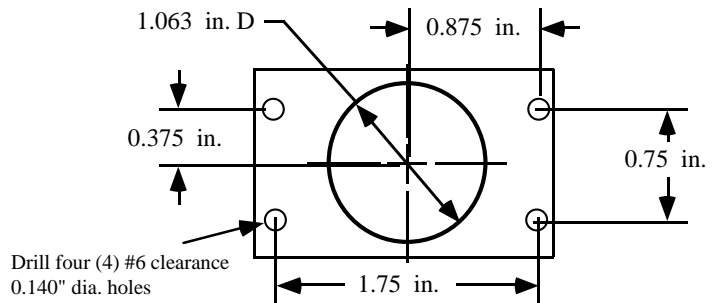
Features:

- Complete self contained units
- Non dispersive infrared (NDIR) technology
- Precision gas calibration kit available
- Fast warm-up
- Industrially robust: 0-5 V and 4-20 mA outputs
- Dual level detect set points and relays
- **Remote gas cell** on 20±2 inch long cable
- Cost effective - High quality
- No moving parts - gas diffusion sampling
- Solid state throughout - linear outputs
- Humidity and moisture resistant
- Dust-tight water resistant fiberglass enclosure
- Digital readout with 0.56 inch red LED display

Model 2156-R 1.0% CO₂



Clearance: 5 high x 7.5 wide x 11 inches long



Diffusion Head Mounting Dimensions

Fresh air is about **0.04%** (400 ppm) CO₂

Application:

- Greenhouses
 - Mushroom Farms
 - Wineries
 - Breweries
 - Food Processing
 - Poultry Incubators/houses
- The VALTRONICS Model 2156 is a non-dispersive infrared (NDIR) carbon dioxide monitor for use as an outdoor air sensor. It produces a control signal proportional to carbon dioxide concentration. This control signal is then used to provide remote control of the outdoor air dampers; thereby controlling the fresh air intake or varying the ventilation rates while maintaining safe indoor air quality. Dual adjustable level detect circuits may be used for alarms.



Carbon Dioxide Monitor

Model 2156-R 1.0%

Description:

The Model 2156-R is a non dispersive infrared gas monitor designed as a fully functioning stand-alone unit for the continuous monitoring of carbon dioxide. The optical system is not effected by humidity. The diffusion gas cell is not effected by variations in relative humidity from 0 to 95%. It has a 0.56 inch high digital readout and two adjustable level detect circuits with associated front panel indicators (yellow and red) and SPDT relay contacts.

This low power, water resistant system makes this an ideal remote sensor to interface with any central control unit. It has linear 0 to 5 volt and 4 to 20 mA current loop outputs. In either configuration, interfaced or stand-alone, this device is an excellent choice for any environment in which the level of carbon dioxide must be monitored or controlled.

Specifications: 2156-R 1.0% CO₂

Method: N.D. I. R. (Non-dispersive Infra-red) Remote Gas diffusion type gas cell
Gas: Carbon dioxide (CO₂)
Range: 0-10,000 ppm (1.0%) CO₂
Accuracy: ±0.025% CO₂ from 0 to 0.5% CO₂ & ± 5% of reading from 0.5% to 1.0% CO₂
Repeatability: ± 1% of full scale (challenge with same gas sample and assure zero)
External Power Source: 115/220 VAC , 50/60 Hz
Power Consumption: less than 8 watts @ 115 VAC
Adjustable Set Points: Dual set points adjustable from 0.10% CO₂ to full scale (audio alarms below)
..... Low SET Point adjusted to 0.3% and High SET Point to 0.5% unless specified on PO
SET POINT Relay Contact Rating: ... SPDT contacts: non-latching N.C., N.O. 3 amp max. at 250 VAC or 30 VDC
Display: 0.56 inch high digital Light Emitting Diode (LED) readout
Output Signals:
Voltage: 0 to 5 volt = 0 to 1.0% CO₂ (linear scale data attached)
Current Loop: 4 to 20 mA = 0 to 1.0% CO₂ (linear scale data attached) 0 to 550Ω load
Audio Alarms: Beeps once a second when Low SET Point is exceeded, continuous when High exceeded
Set Point Indicators: Yellow flashes when Low SET Point is exceeded, RED on continuous when High exceeded
Zero Drift at Constant Temperature: Less than 2% of full scale per month (random not cumulative)
Zero Noise at Constant Temperature: Less than 50 mV peak to peak measured during any 20 second period
..... measured on voltage output (equals less than 1% of full scale)
Zero Drift due to Ambient Temperature: Less than 0.5% of full scale per degree Centigrade
Operating Temperature Range: .. 0 to 50°C (32° to 122°F) see **Application Note A12**
Storage Temperature Range: -40 to +70°C (-40 to +158°F)
Operating Humidity Range: 0 to 95% RH (non-condensing) in gas cell
Weight: Less than 6 pounds (< 2.72 kilograms)
External Clearance Dimensions: . 5 inches high, 7.5 inches wide, 11 inches long
Mounting, four 0.312 inch dia holes ... Mounting centers 4.0 inch x 8.75 inch: see diagram



Terminal block TB1 has a linear 0 to 5 volt output signal on pin number 9 with respect to pin number 8 which is signal common. Pin number 7 has a linear 4 to 20 mA current loop signal referenced again to pin number 8. See the wiring diagram on page 4.

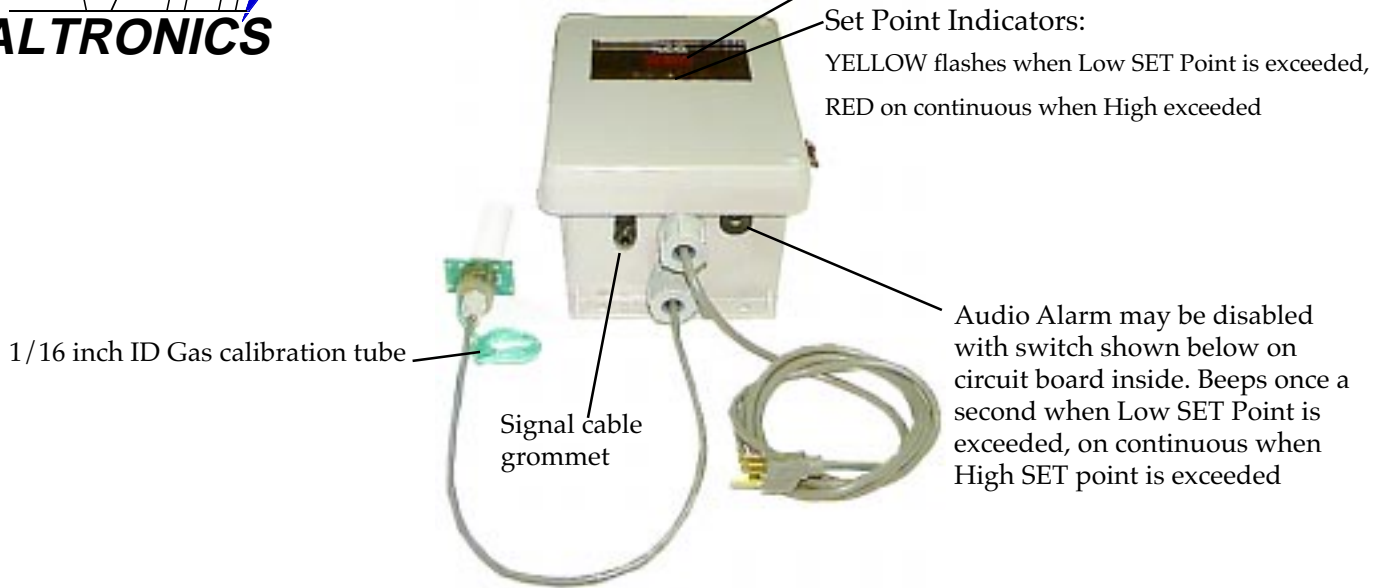
The table below shows both the linear 0 to 5 volt and the 4 to 20 mA current loop responses to 0 to 1.0% carbon dioxide diffusing through the gas cell. The wires from TB1 go through the strain relief cable grommet shown on page 4. The resulting wire bundle must be between 0.090 and 0.25 inch diameter to be properly stain relieved.

VALTRONICS 1% Gas & 5 volt fu							
<i>Gas in %</i>	<i>Output in volts</i>	<i>±5% of Reading</i>		<i>4-20 mA output</i>	<i>±5% of Reading</i>		<i>4-20 mA across 500Ω in volts</i>
		<i>Max.</i>	<i>Min.</i>		<i>Max.</i>	<i>Min.</i>	
0.00	0.000	0.125	-0.125	4.00	4.40	3.60	2.00
0.02	0.100	0.225	-0.025	4.32	4.72	3.92	2.16
0.04	0.200	0.325	0.075	4.64	5.04	4.24	2.32
0.06	0.300	0.425	0.175	4.96	5.36	4.56	2.48
0.08	0.400	0.525	0.275	5.28	5.68	4.88	2.64
0.10	0.500	0.625	0.375	5.60	6.00	5.20	2.80
0.12	0.600	0.725	0.475	5.92	6.32	5.52	2.96
0.14	0.700	0.825	0.575	6.24	6.64	5.84	3.12
0.16	0.800	0.925	0.675	6.56	6.96	6.16	3.28
0.18	0.900	1.025	0.775	6.88	7.28	6.48	3.44
0.20	1.000	1.125	0.875	7.20	7.60	6.80	3.60
0.22	1.100	1.225	0.975	7.52	7.92	7.12	3.76
0.24	1.200	1.325	1.075	7.84	8.24	7.44	3.92
0.26	1.300	1.425	1.175	8.16	8.56	7.76	4.08
0.28	1.400	1.525	1.275	8.48	8.88	8.08	4.24
0.30	1.500	1.625	1.375	8.80	9.20	8.40	4.40
0.32	1.600	1.725	1.475	9.12	9.52	8.72	4.56
0.34	1.700	1.825	1.575	9.44	9.84	9.04	4.72
0.36	1.800	1.925	1.675	9.76	10.16	9.36	4.88
0.38	1.900	2.025	1.775	10.08	10.48	9.68	5.04
0.40	2.000	2.125	1.875	10.40	10.80	10.00	5.20
0.42	2.100	2.225	1.975	10.72	11.12	10.32	5.36
0.44	2.200	2.325	2.075	11.04	11.44	10.64	5.52
0.46	2.300	2.425	2.175	11.36	11.76	10.96	5.68
0.48	2.400	2.525	2.275	11.68	12.08	11.28	5.84
0.50	2.500	2.625	2.375	12.00	12.40	11.60	6.00
0.52	2.600	2.730	2.470	12.32	12.74	11.90	6.16
0.54	2.700	2.835	2.565	12.64	13.07	12.21	6.32
0.56	2.800	2.940	2.660	12.96	13.41	12.51	6.48
0.58	2.900	3.045	2.755	13.28	13.74	12.82	6.64
0.60	3.000	3.150	2.850	13.60	14.08	13.12	6.80
0.62	3.100	3.255	2.945	13.92	14.42	13.42	6.96
0.64	3.200	3.360	3.040	14.24	14.75	13.73	7.12
0.66	3.300	3.465	3.135	14.56	15.09	14.03	7.28
0.68	3.400	3.570	3.230	14.88	15.42	14.34	7.44
0.70	3.500	3.675	3.325	15.20	15.76	14.64	7.60
0.72	3.600	3.780	3.420	15.52	16.10	14.94	7.76
0.74	3.700	3.885	3.515	15.84	16.43	15.25	7.92
0.76	3.800	3.990	3.610	16.16	16.77	15.55	8.08
0.78	3.900	4.095	3.705	16.48	17.10	15.86	8.24
0.80	4.000	4.200	3.800	16.80	17.44	16.16	8.40
0.82	4.100	4.305	3.895	17.12	17.78	16.46	8.56
0.84	4.200	4.410	3.990	17.44	18.11	16.77	8.72
0.86	4.300	4.515	4.085	17.76	18.45	17.07	8.88
0.88	4.400	4.620	4.180	18.08	18.78	17.38	9.04
0.90	4.500	4.725	4.275	18.40	19.12	17.68	9.20
0.92	4.600	4.830	4.370	18.72	19.46	17.98	9.36
0.94	4.700	4.935	4.465	19.04	19.79	18.29	9.52
0.96	4.800	5.040	4.560	19.36	20.13	18.59	9.68
0.98	4.900	5.145	4.655	19.68	20.46	18.90	9.84
1.00	5.000	5.250	4.750	20.00	20.80	19.20	10.00

Accuracy = ± 0.025 % CO2 from 0.0% CO2 to 0.5% CO2
 Accuracy = ±5% of reading from 0.5% CO2 to 1.0% CO2
 Chart revised on 10-8-97



RED 0.56 inch high digital Light Emitting Diode (LED) display



Preventive Maintenance:

Gas calibration should be done every six months. At least calibration with zero gas (nitrogen) every six months and both zero and span (certified 0.5% CO₂) at least once a year. Span calibration using 0.5% CO₂ would give you better accuracy on the low end of the scale where most measurements will occur (see Application Note A11 for an example of typical Industrial Safety CO₂ measurements). A calibration log book where you record how much ZERO and SPAN had drifted before it was recalibrated will help you decide what the optimum duration between calibrations should be. See Application Note A35 for detailed calibration instructions. The flow rate should be set to about 0.3 Liters per minute.

Caution: Note jumper configuration for either 115 (JP1 & JP2) or 230 VAC (JP3 only) operation.

