

CO₂ Diffusion Head Model 2156 Calibration Instructions

CO₂ Diffusion Head Calibration Kit:

2 cylinders of calibration gas:

99.8% **Nitrogen (ZERO gas)**

1.0 +/-0.02% CO₂ (SPAN gas)

or a **0.5 +/-0.01% CO₂** for a 3% unit

Regulator:

reusable **0.3 LPM (300 ml/min)**
with on/off valve

Flow meter - 1-500 ml/min

Tubing, #10-32 hose barb

Twin-pack carrying case

To order please call (209) 754-0707

or FAX (209) 754-0104



#10-32 hose barb

Gas calibration should be done a minimum of once every (6) six months (at least **ZERO** calibration). If you keep a log book on calibration and record how much zero & span drift occur you can verify if the calibration interval is correct. You may find that ZERO calibration every 6 months and both ZERO & SPAN only once a year is sufficient to maintain accuracy.

Calibration INSTRUCTIONS: see [Application Note A46](#) for adjustment locations

1. Remove protective cap from top of nitrogen cylinder. Push and thread pressure regulator valve onto cylinder outlet. Nitrogen is **ZERO** gas. Fresh air is about **0.04%** CO₂
2. Connect plastic tubing from pressure regulator outlet to flow meter inlet. (bottom connection of flow meter) **Caution:** your breath contains about **3%** CO₂
3. Connect plastic tubing from flow meter outlet (top connection) to unit to be tested.
4. Make sure unit to be tested is turned on and has had a 5 minute warm-up.
5. Connect voltmeter to 0-5V output (pin# **9 + lead** and pin# **8 - lead** of voltmeter).
6. Make sure flow meter is in an upright position. Open flow valve slowly while observing flow meter.
7. Adjust the flow to between 250 - 350 ml/min (the regulator should limit flow to about 300).
8. After 3 minutes of continuous nitrogen flow, observe signal output and perform **ZERO** adjustment (**0.00 +/-0.05 volts**) if required.
9. Turn off flow valve and remove pressure regulator valve from nitrogen cylinder.
10. Replace nitrogen cylinder with cylinder containing SPAN gas (0.1%CO₂ for a 0.2% full scale unit, 0.5%CO₂ for a 1%unit, 1%CO₂ for a 2% or 3% FS unit, 2%CO₂ for a 5% FS unit, 5% CO₂ for a 10% FS unit)
11. Open flow valve and observe signal output. (see scale data for voltage reading)
12. Allow sample to flow until final indication is obtained. Adjust **SPAN** potentiometer if required. (see scale data for voltage reading) A Model 2156 5% unit will give 2.00 volts using 2.0% CO₂ tank. A 3% unit will give 1.67 V using 1.0% CO₂. A 1% unit will give 2.5 V using 0.5% CO₂.
13. Turn off flow valve and remove pressure regulator from cylinder.



23 x 9 x 4.5 inches

0 to 500 ml/minute flow meter # 0290, tubing # 651, # 10-32 Hose barb # 0308, 0.3 L/min pressure regulator# 362 with flow valve, two # 0304 plastic hose barbs for the flow meter & two # 0651 plastic tubes.



Notes:

- **Field Calibration Kits** are available. See **page 3** for Ordering part numbers they consist of: one tank with an 8 hour supply of 99.8% N₂
one tank with an 8 hour supply of 5.0% CO₂
a pressure regulator, flow meter, and carrying case
Concentrations of 0.1% (1000 +/-20 ppm certified) CO₂, 0.2%, 0.5%, 1%, 5%, & 15% are in stock. These are all certified to be +/-2% of reading.
- Replacement 8 hour gas tanks for the CO₂ and for N₂.
These 14" high tanks contain 3.6 ft³ or 103 liters @70 degrees F and 1000 PSIG.
- Special gases and concentrations may be ordered with 3-6 week lead times depending on the specific gas ordered.
- All volume discounts are based upon a single shipment
- Prices are subject to change without notice.

Table of **VALTRONICS** part numbers to order different concentrations of carbon dioxide.

You should use a **tank value** near mid-scale and **not at full scale**.

Examples: 1000 ppm (0.1%) CO₂ for a 2000 ppm full scale unit like a 6289.

1.0% CO₂ for a 3% full scale unit like a Model 2156 or 2166.

5.0% CO₂ for a 10% full scale unit like a Model 2008, 2166, or 2015SPI-3

<u>VALTRONICS</u> part #	<u>Certified CO₂ concentration</u>
030181	Kit 0.1% (1000 ppm) CO ₂ +/-2% of reading Certified = 0.100+/-0.002% CO ₂
030337	Kit 0.5% (5000 ppm) CO ₂ +/-2% of reading Certified = 0.500+/-0.010% CO ₂
030338	Kit 1.0% (10000 ppm) CO ₂ +/-2% of reading Certified =1.000+/-0.020% CO ₂
030339	Kit 5.0% (50000 ppm) CO ₂ +/-2% of reading Certified =5.000+/-0.100% CO ₂
0616	Replacement nitrogen (N₂) tank for ZERO adjust.
0615	Replacement 0.1% (1000 ppm) CO₂ tank for SPAN adjust on 2000 ppm units.
0610	Replacement 0.2% (2000 ppm) CO₂ tank for SPAN adjust on 5000 ppm units.
0611	Replacement 0.5% (5000 ppm) CO₂ tank for SPAN adjust on 1% units.
0836	Replacement 1.0% (10,000 ppm) CO₂ tank for SPAN adjust on 2% or 3% units.
0856	Replacement 2.0% (20,000 ppm) CO₂ tank for SPAN adjust on 3% or 5% units.
0612	Replacement 5.0% (50,000 ppm) CO₂ tank for SPAN adjust on 10% units.
0837	Replacement 10% (100,000 ppm) CO₂ tank for SPAN adjust on 20% units.

Pressure regulator to limit flow to 300 ml per minute.

Tank of **Certified** CO₂ with balance of nitrogen



Two (2) #0651 3/16 ID x 3 ft long plastic tubes. One to bottom of flow meter & one from top of flow meter to the #0308 #10-32 hose barb on the gas cell.

0 to 500 ml (0.500 L/min) per min. #0290 **flow meter** with two # 0304 3/8 NPT to 3/16 ID hose barbs