



Application Note A51

Model 6289 Wiring & Calibration Adjustments

A minor ZERO adjustment on fresh air of about 400 ppm CO₂ may be necessary after installation. Adjust R59 (ZERO) next to the RED indicator for a 0-5 voltage output of 1.0 volts for fresh air. Try to assure that the air is fresh inside the duct. DO NOT adjust SPAN without calibration gas.

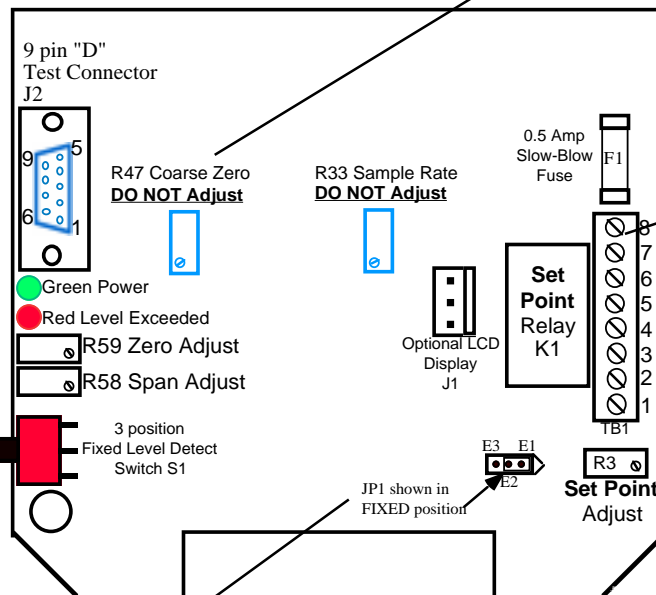
CAUTION: DO NOT connect a Model 6289 to the same 24 VAC transformer that powers an older Model 2088 or 2089 since they require a **floating 24 VAC**. TB1, Pin #8 on the 6289 is **grounded** and this may burn out the 2088 or 2089 power supply.

See **Application Notes** A25 or A40 for info about gas calibration and page 2 for **ZERO** on fresh air. Gas calibration kits allow you to flow certified gas into the **green** plastic cal tube at about 300 ml/min flow rate. The tube should be pinched off for normal operation.

Level Detect Switch
Middle position is 1000 ppm or 2.5 volts. This does not effect the calibration of the sensor just when the relay energizes and the RED indicator comes on. Customers using an HVAC controller to monitor the 4-20 mA output signal may not use this function at all. Placing the jumper JP1 in the variable position E2 to E3 and adjusting potentiometer R3 fully clockwise will keep the RED indicator OFF until the level goes above 2000 ppm.

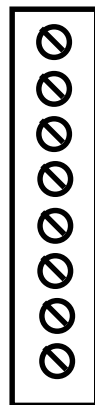
Model 6289 Wiring

The **COARSE ZERO** adjust may be used to center the fine zero adjust R59 but adjust it **slowly**. There is a **10 second delay** in the response.



TB1

TB1



optional ground on pin 8

24 VAC

0-5 V out pin 6 to 5 with DVM

20.0 V min / 30 max
12 VA power rating
From 24VAC transformer

to 4-20 mA input at controller - **DO NOT connect 26 VDC**

The **4-20 mA current loop** (pins 4 & 5) has its own 15 VDC internal power supply so **NO External Power is required in this loop**. Pins 1, 2, 3, are the **SET Point Relay** contacts - see the 6289 specification.

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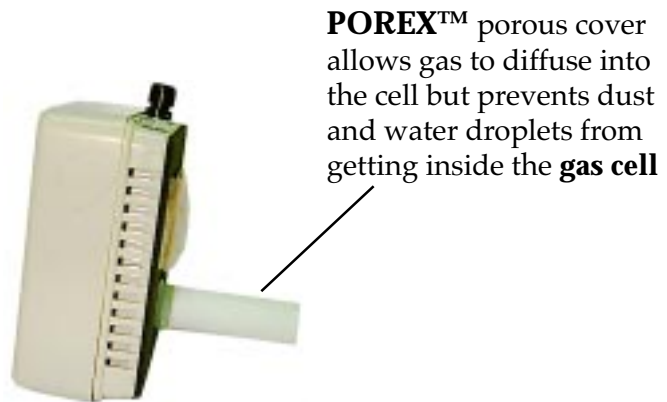
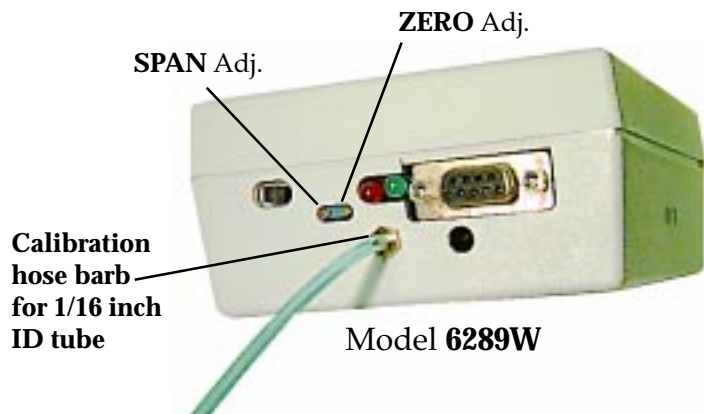
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The following chart shows the signal output response, both 0 to 5 volt and 4-20 mA current loop response to 0 to 2000 ppm by volume of CO₂. **Fresh air** is about **400 ppm** CO₂ so it should give a response of about **1.0 volts** or **7.2 mA** in the current loop (the voltage output drives the current loop). Please remember that no external power should be in the current loop. It has its own internal +15 VDC power supply.

If you do not have a gas calibration kit you may adjust **ZERO** for a voltage output of about **1.0 volt** in **fresh air**. Only adjust **SPAN** (R58) if you first adjust **ZERO** (R59) with nitrogen flowing into the calibration tube for a voltage output of **0.00 volt**. Then flow certified **1000±20 ppm CO₂** calibration gas at about **300 ml/min** into the calibration tube for the **SPAN** adjustment for a voltage output of **2.50 volts**.

PPM CO ₂	Output V	Max	Min	4-20 mA	Max	Min
0	0.000	0.125	-0.125	4.00	4.4	3.6
50	0.125	0.250	0.000	4.40	4.80	4.00
100	0.250	0.375	0.125	4.80	5.20	4.40
150	0.375	0.500	0.250	5.20	5.60	4.80
200	0.500	0.625	0.375	5.60	6.00	5.20
250	0.625	0.750	0.500	6.00	6.40	5.60
300	0.750	0.875	0.625	6.40	6.80	6.00
350	0.875	1.000	0.750	6.80	7.20	6.40
400	1.000	1.125	0.875	7.20	7.60	6.80
450	1.125	1.250	1.000	7.60	8.00	7.20
500	1.250	1.375	1.125	8.00	8.40	7.60
550	1.375	1.500	1.250	8.40	8.80	8.00
600	1.500	1.625	1.375	8.80	9.20	8.40
650	1.625	1.750	1.500	9.20	9.60	8.80
700	1.750	1.875	1.625	9.60	10.00	9.20
750	1.875	2.000	1.750	10.00	10.40	9.60
800	2.000	2.125	1.875	10.40	10.80	10.00
850	2.125	2.250	2.000	10.80	11.20	10.40
900	2.250	2.375	2.125	11.20	11.60	10.80
950	2.375	2.500	2.250	11.60	12.00	11.20
1000	2.500	2.625	2.375	12.00	12.40	11.60
1050	2.625	2.756	2.494	12.40	12.82	11.98
1100	2.750	2.888	2.613	12.80	13.24	12.36
1150	2.875	3.019	2.731	13.20	13.66	12.74
1200	3.000	3.150	2.850	13.60	14.08	13.12
1250	3.125	3.281	2.969	14.00	14.50	13.50
1300	3.250	3.413	3.088	14.40	14.92	13.88
1350	3.375	3.544	3.206	14.80	15.34	14.26
1400	3.500	3.675	3.325	15.20	15.76	14.64
1450	3.625	3.806	3.444	15.60	16.18	15.02
1500	3.750	3.938	3.563	16.00	16.60	15.40
1550	3.875	4.069	3.681	16.40	17.02	15.78
1600	4.000	4.200	3.800	16.80	17.44	16.16
1650	4.125	4.331	3.919	17.20	17.86	16.54
1700	4.250	4.463	4.038	17.60	18.28	16.92
1750	4.375	4.594	4.156	18.00	18.70	17.30
1800	4.500	4.725	4.275	18.40	19.12	17.68
1850	4.625	4.856	4.394	18.80	19.54	18.06
1900	4.750	4.988	4.513	19.20	19.96	18.44
1950	4.875	5.119	4.631	19.60	20.38	18.82
2000	5.000	5.250	4.750	20.00	20.80	19.20

Caution: A person's breath may contain as much as 3% (30,000 ppm) of CO₂. Breathing on the sensor may cause the output response to peg beyond full scale. Even though **fresh air** is about 0.04% (**400 ppm**) CO₂ a room with people in it will easily climb up near 1000 ppm or higher. See **Application Note A41**.



Replacement **0.1% CO₂**
SPAN Gas tank :
order# 0615

Replacement **nitrogen N₂**
ZERO Gas tank :
order# 0616



23 by 8.5 inches

Regulator,
0 to 500 ml/min
flow meter and
tubing

Notes:

- **Field Calibration Kits** consist of:
 - one tank with an **8 hour supply** of **99.8%** nitrogen (N₂)
 - one tank with an **8 hour supply** of **1000 ppm (0.1%) CO₂**
 - a pressure regulator, flow meter, and carrying caseConcentrations of **0.1% (1000 ±20 ppm certified)** CO₂, 0.2%, 0.5%, 1%, 5%, and 15% are in stock. These are all certified to be ±2% of reading.
- Replacement gas tanks are available for the CO₂ (order # **0615**) & for N₂ (order # **0616**). These **14" high** tanks contain 3.6 ft³ or **103 liters** @70°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