



**Operating Instructions for n-type Sensor Evaluation Circuit**  
 (LEL Hydrogen, Trace Hydrogen, VOC, Flammable, NH<sub>3</sub>, H<sub>2</sub>S)

Part number 7000004-000 is a general purpose amplifier for n-type chemiresistive sensors, i.e., sensors that show a high resistance in air and lower resistance in the presence of the gas being sensed. The circuit is powered with 9 VDC applied to J1. Gain is set by the series combination of R9 (fixed) and VR2 (variable gain control), and offset (or zero) is controlled using VR3. VR1 serves to adjust the heater voltage, which in turn affects the nominal operating temperature of the sensor. The sensor may be connected on-board at SKT-1, or externally through J2. Output at J3 is 0-5 VDC, with higher sensor response corresponding to higher voltages.

**Connectors:**

J1:

Pin	Description
1 (left)	Circuit ground
2 (right)	+9 to +12 VDC (unregulated)

J2:

Pin	Description
1 (bottom)	Heater
2	Sensor
3	Heater ground
4 (top)	Sensor ground

J3:

Pin	Description
1 (bottom)	Circuit ground
2 (top)	Signal out

**Adjustment:**

*Heater:* The heater voltage is adjusted at the factory for a particular sensor type, and typically does not require further adjustment. If the heater potentiometer VR1 should be accidentally changed, or should otherwise require adjustment, then this should be done with reference to a target voltage measured at pins 1 and 3 of J2. The target voltage is dependent on the sensor type, and should be supplied by the factory with the sensor. Note that the sensor requires a warm-up period. Synkera recommends no less than 1 hour and up to 48 hours best stabilization.

*Sensor zero:* Sensor zero is adjusted using potentiometer VR3 with no gas applied (high sensor resistance), or alternatively with the sensor disconnected (infinite sensor resistance). With a voltmeter connected to J3, turn VR3 counter-clockwise until a minimum signal (approximately 6 mV) is reached. Do not over-adjust: the potentiometer should be set at the point where the minimum voltage is attained, but starts to climb when VR3 is turned clockwise.

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*Sensor gain:* Sensor gain is adjusted using potentiometer VR2. With full-scale gas applied, measure voltage at J3. When the output becomes steady, adjust to 5 VDC. Note that the range of the gain control is limited by the selection of R9 and VR2 resistance values; this is factory selected for the sensor type in use. Data relating to the full-scale gain adjustment limits are supplied with the sensor.

