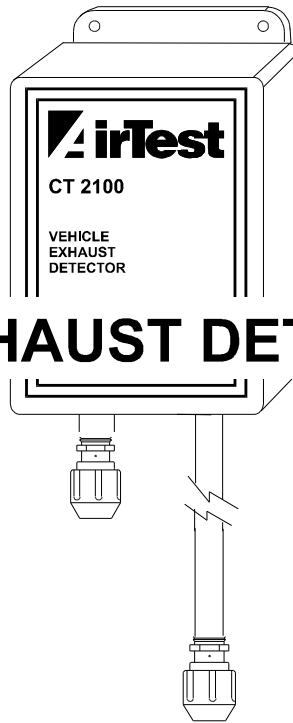


AirTest Technologies, Inc



OPERATION MANUAL

CT-2100 VEHICLE EXHAUST DETECTOR



ATI AirTest Technologies, Inc
#9, 1520 Cliveden Avenue
Delta, B.C. V3M 6J8
Ph. (604) 517-3888
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CT 2100 VEHICLE EXHAUST DETECTOR

INTRODUCTION: The CT 2100 is a dual sensor, carbon monoxide and propane/natural gas vehicle exhaust detector. It is a wall-mounted, stand-alone, self-contained gas detection system designed to rugged, commercial installation specifications that require continuous 24 hour a day monitoring. It is typically used in areas such as enclosed or underground parking structures, loading docks, equipment rooms or arenas where gasoline engine exhaust could pose a health problem. The detector is produced in single sensor (CT 1100) or dual sensor (CT 2100) configurations. In addition to the normal vehicle exhaust sensors, the CT 2100 can be supplied with ammonia or other refrigerant gas sensors to satisfy a variety of monitoring applications. It is backed by a two year warranty.

FEATURES OF THE CT 2100 SYSTEM:

- ! **Dual sensor system** - Sensors can be the same gas or different gases.
- ! **User selectable time delay** - Relay activation circuit board selects the desired delay.
- ! **User settable alarm points** - Low and high alarm points can be set anywhere within the instrument range.
- ! **User configurable alarm operation** - Independent, low turns off before high turns on and dependent, low remains on when high turns on.
- ! **5 heavy duty relays** - Provided.
- ! **Audible alarm** - On/off switch provided.
- ! **System test switch** - To simulate alarm conditions for testing installations, the test sequence is initiated with a momentary contact switch. The unit automatically returns to normal operating mode after the test is completed.
- ! **Temperature compensation** - The sensor provides more accurate measurements.
- ! **Fail-safe system design** - If conditions exist such as sensor connection being severed, sensor burn-out, circuit board failure, etc. the "fail" LED illuminates, the audible alarm is activated and the fail relay energizes the exhaust fans which will run until the fail condition is rectified. If a total power failure to the CT 2100 is experienced, the fail relay will still activate the exhaust fans.
- ! **Compact** - The system is self-contained in a small wall mount enclosure.
- ! **Status display** - 3 LED panels indicate Power On, Fail State, Low and High Alarm State.
- ! **Choice of Rear or top entry** - Pre-drilled holes and plugs provided for easy installation.

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CT 2100 VEHICLE EXHAUST DETECTOR

SPECIFICATIONS:

Sensor type: Solid-state, life expectancy >5 years
Sensor gases: CO, Propane/Natural Gas (contact factory for other requirements)
Sensor config: Dual, 1 internal + 1 remote .
Circuit Design: Solid state with temperature compensation at the sensor
Display: LED indicators for Power on, Fail, Low and High Alarm
Relays, type: 3 - 10 Amp. 115 Volt SPDT standard, 2 additional 10 Amp. SPDT optional
Relays, operation: NO/NC configuration, time delay on activation - user settable by switch
Alarm Points: User settable within range of the instrument.
Audible Alarm: 100 dB, internal on/off switch
Test Provision: Momentary test switch to simulate alarm conditions
Operating Temp: -20C to + 50C
Humidity: 0 to 90% non-condensing
Power Input: 115 VAC, 24 VAC or 24 VDC
Weight: 6 lbs. (2.7 kg.)
Size: 8 x 6 x 3.5 in. (20 x 15 x 9 cm)
Enclosure: NEMA rated, 14 gauge enameled steel
Warranty: 2 years

OPTIONAL ITEMS:

Lower sensor guard
Calibration Gas Kits

AirTest continues to work on product improvement, therefore, specifications are subject to change without notice.

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SETTING THE ALARM POINTS:

The sensor should be allowed to warm up and stabilize for 24 hours before setting alarm points.

Method using DVM and Calibration gas.

1. Connect voltmeter negative probe to the REF (Black) test point. Connect the positive probe to the YELLOW test point corresponding to the sensor being calibrated.
2. Apply ~~low~~ calibration gas, at the appropriate rate, to the sensor and note the maximum voltage reading. (Takes 1 ? to 2 minutes).
3. Connect voltmeter positive probe to the RED low alarm test point of the sensor being calibrated and set the voltage to the value noted in Step 2. Low alarm is now set for that sensor.
4. Repeat steps 1 to 3 using ~~high~~ calibration gas and high alarm test point.
5. Repeat steps 1 to 4 for second sensor.

Method using calibration gas only.

The alarm points can be adjusted and set at any time while the CT-2100 is powered and ON. If the unit is in alarm, turn the alarm trimpot you wish to adjust (counterclockwise) until it comes out of alarm. Alarm settings should always be made from an out-of-alarm state to an alarm state.

1. Using the appropriate flow rate, apply a calibration gas mixture to the sensor equal to the level required for the LOW alarm point. Allow 1 ? to 2 minutes for sensor to stabilize.
2. Adjust alarm 1 (LOW) so that the relay 1(LOW) LED comes on. (Red LED on front cover).
3. Repeat for alarm 2 (LOW).
4. Apply a calibration gas mixture to the sensor equal to the level required for the HIGH alarm point.
5. Adjust alarm 1 (HIGH) so that the relay 1 (HIGH) LED comes on. (Red LED on front cover).
6. Repeat for alarm 2 (HIGH)

Calibration Gas Flow Rates:

MOS Sensor 0.4 SCFH (0.2 LPM)
NO2 Electrochemical Sensor 2.0 SCFH (1 LPM)

For calibration of the Electrochemical Sensor, see appendix A

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115 VAC, 24 VDC or 24 VAC supply
(Conduit & wiring by others)

There are also removable plugs in the centre of the back of the enclosure for rear entry of power supply



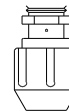
Dual Channel System

CO sensor



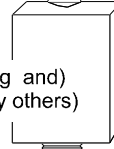
5 Feet from floor

Refrigerant sensor

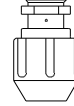


18 Inches from floor

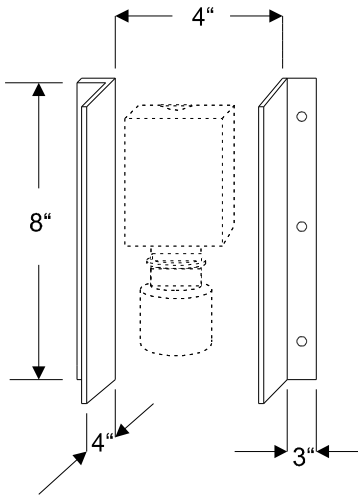
(Conduit, wiring and)
(junction box by others)



Combustible gas sensor
(Propane)

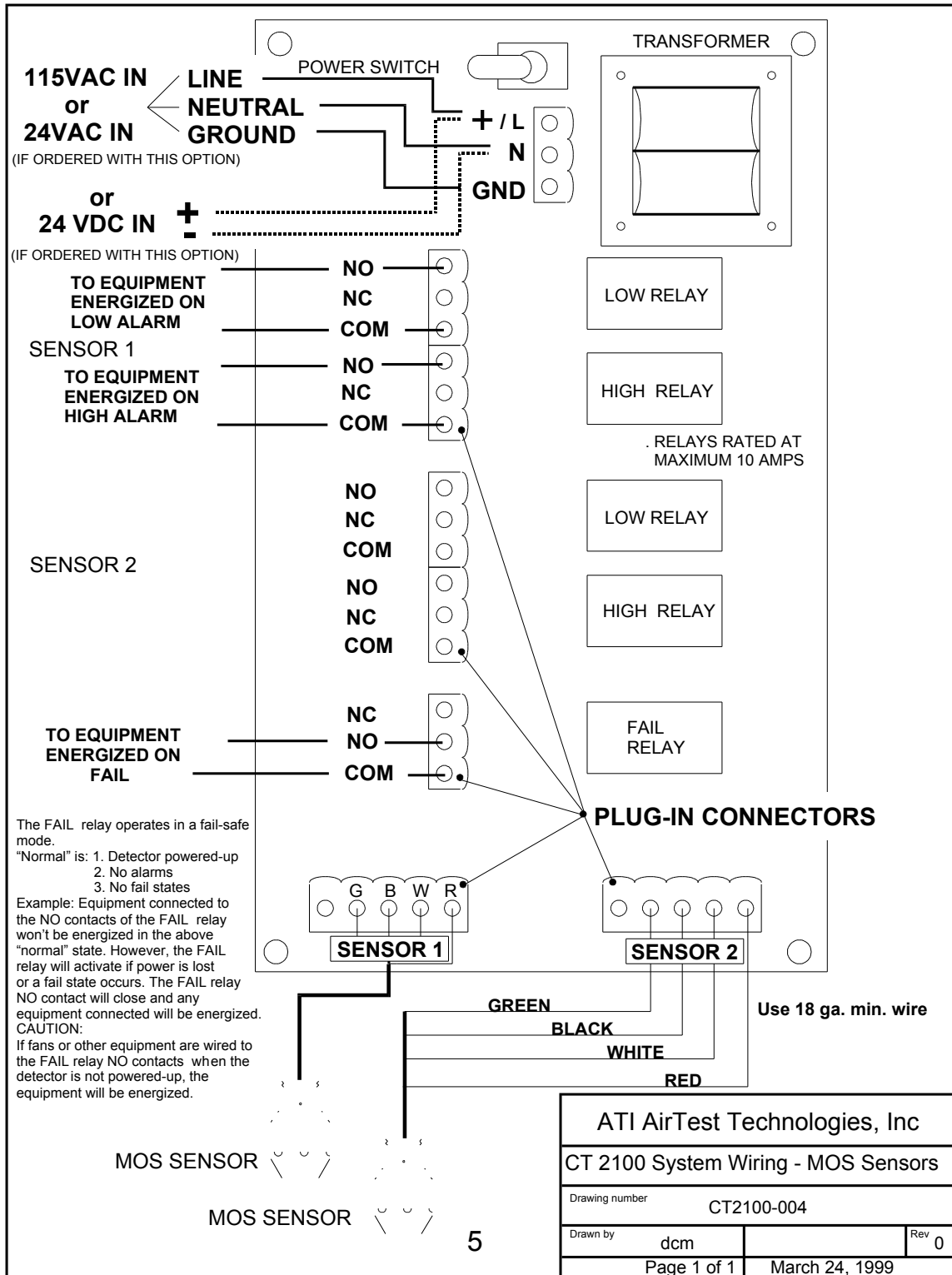


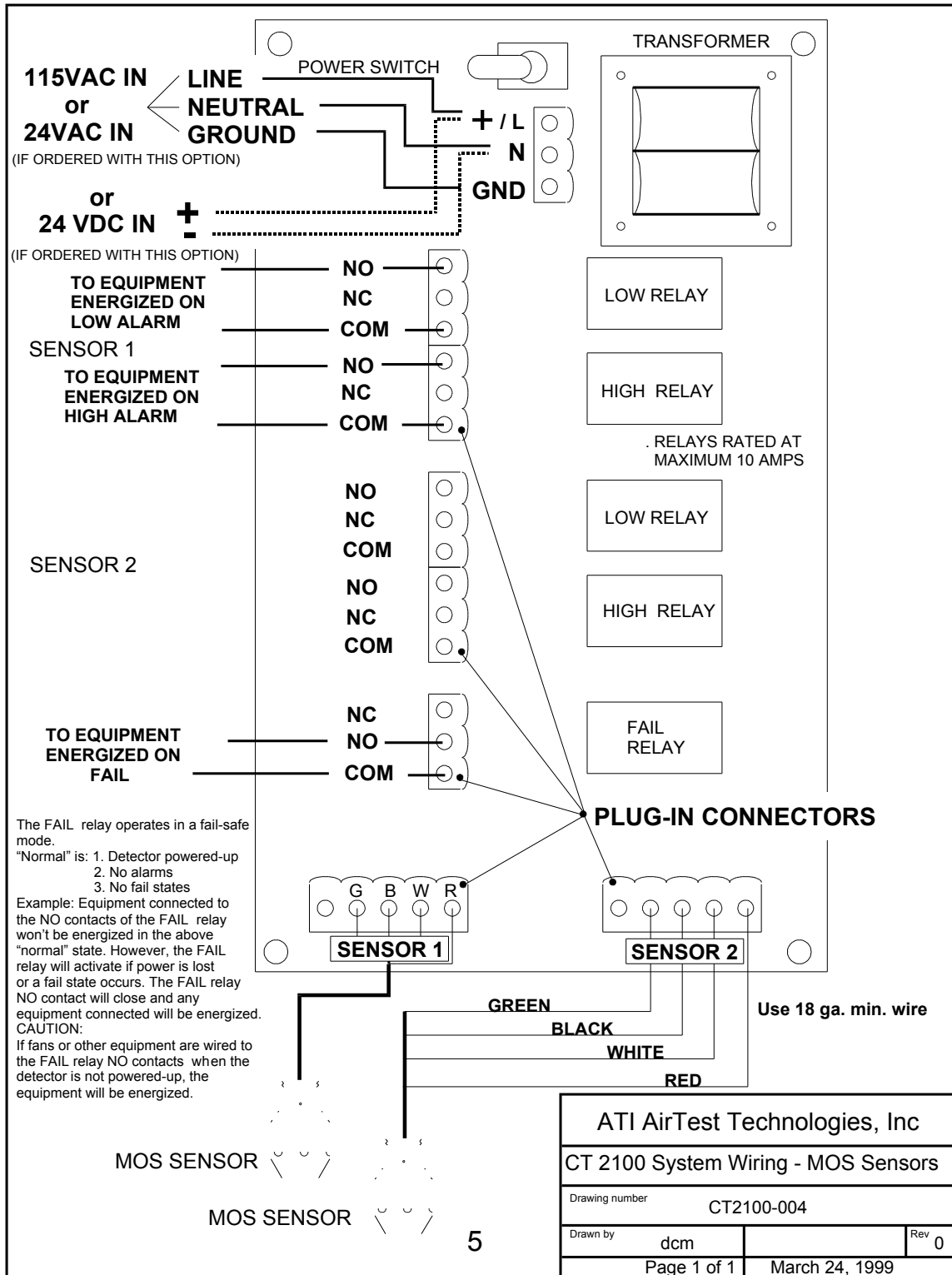
6 inches from floor

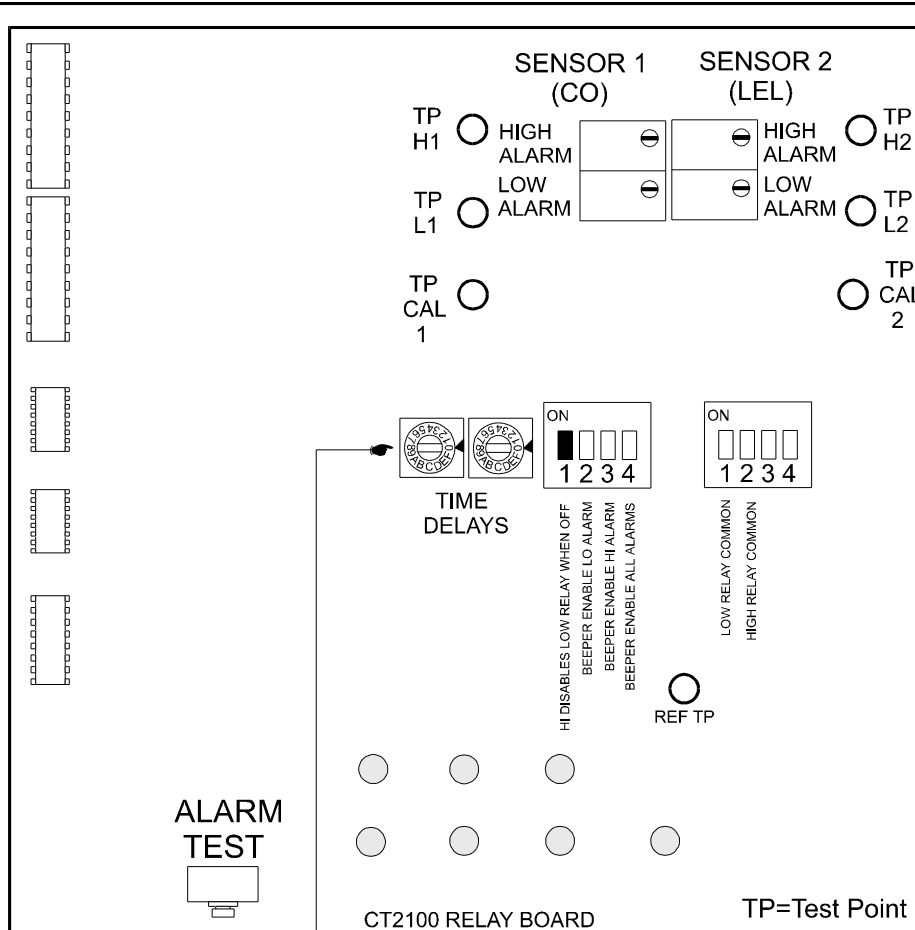


Guard Installation

ATI AirTest Technologies, Inc		
CT 2100 System Installation		
Drawing number		CT2100-003
Drawn by	dcm	Rev 0
Page 1 of 1		March 24, 1999







Relay time delays:

Setting	Low On Delay	Low Off Delay	High On Delay
0	0	0	0
1	1 minute	5 minutes	2 minutes
2	2 minutes	10 minutes	5 minutes
3	3 minutes	10 minutes	5 minutes
5	4 minutes	10 minutes	5 minutes
6	5 minutes	10 minutes	5 minutes
7	10 minutes	15 minutes	10 minutes
A	15 minutes	15 minutes	15 minutes

ATI AirTest Technologies, Inc

CT 2100 - Test Points/PotentiometerLayout

Drawing number CT2100-005

Drawn by dcm Rev 0

Page 1 of 1 March 24, 1999

CT 2100 APPENDIX A 4 - 20 mA OPERATION

Sensor + 12 VDC and Signal Return are connected to the 2 pin sensor input connector as shown below. On AirTest 4 - 20 mA transmitters there is no need to observe the polarity.

When equipped with a 4 - 20 mA input capability, the CT-2100 is factory set so that 0.4V equates to 4 mA and 2.0V equates to 20 mA. (Measured at **REF** (Black) negative Test Point and **ZERO/SPAN** (Yellow) positive Test Point.

To set the alarm points, connect negative probe of voltmeter to **REF** (Black) Test Point and positive to **LOW or HIGH** (Red) Test Point.

Set the voltage with corresponding alarm trimpot to read the value obtained from the graph below.

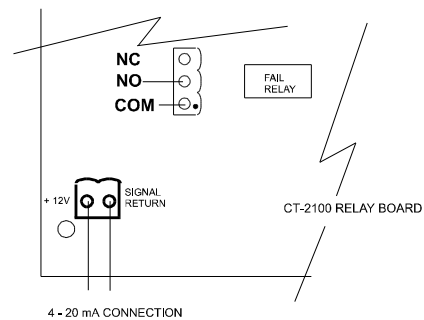
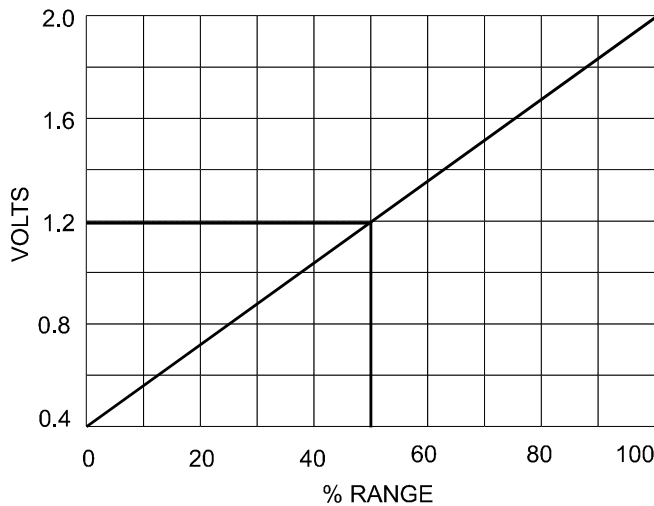
The graph displays voltage on the vertical axis (0.4V to 2.0V corresponding to 4mA to 20mA) and transmitter range on the horizontal axis (0 to 100%).

e.g. An NO2 sensor with a range of 0 - 10 ppm is connected at the transmitter.
 An alarm point of 5 ppm is desired, this is 5/10 = 50% of range.
 50% of range = 1.2V
 Set alarm voltage at 1.2V

This value can also be calculated as follows:

$$\text{ALARM VOLTAGE} = \left[\frac{\text{DESIRED ALARM POINT}}{\text{MAXIMUM RANGE OF SENSOR}} \times 1.6 \right] + 0.4$$

Note: The sensor range is set at the transmitter, see TR-3200 manual.



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