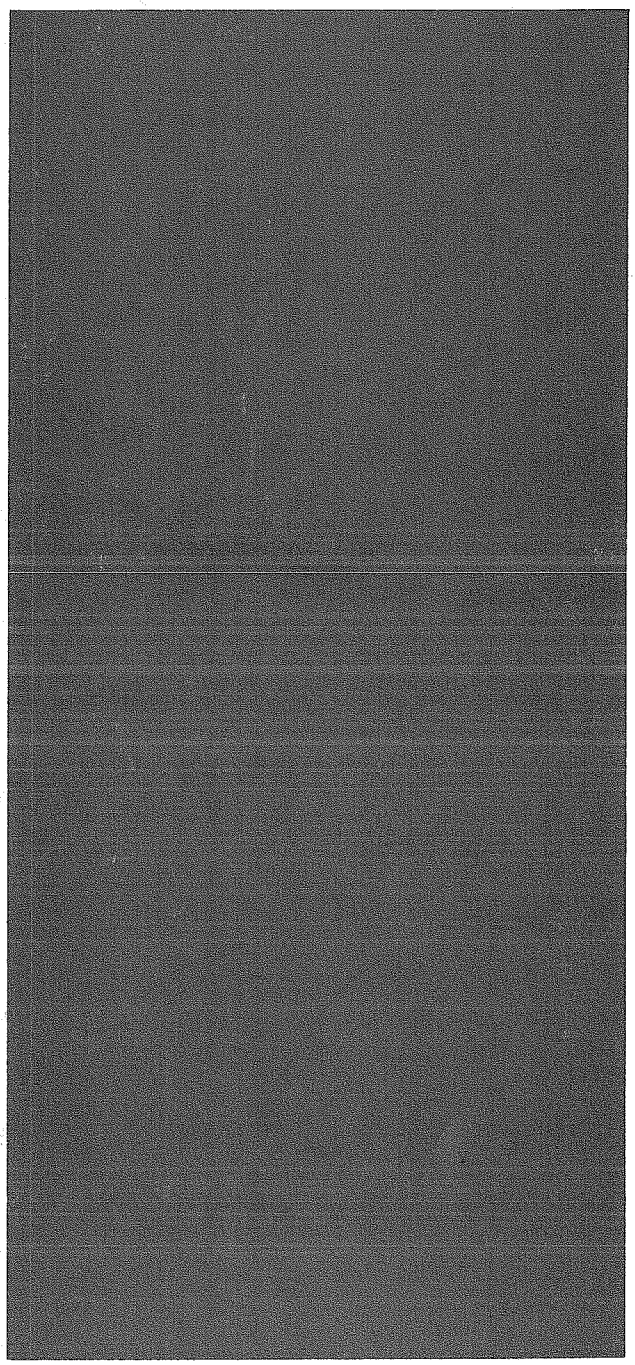
DET TRONICS

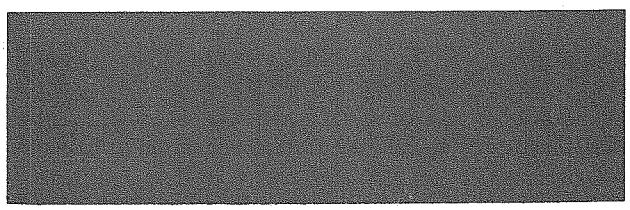


INSTRUCTIONS

Combustible Gas Detection System

R8466 Dual Channel Controller

C7061C Detector



4/87 Form 95-8285-02

WARRANTY POLICY

Detector Electronics Corporation products are manufactured from high quality components and the completed device is rigorously inspected and tested before shipment; however, any electronic device is subject to failure beyond the control of the manufacturer. To ensure system reliability, it is important for the user to maintain the system as recommended by the instruction manuals and to determine the frequency of functional checking of the system required for each specific installation. The more frequent the checking, the greater the system reliability. For the highest reliability, a completely redundant system is necessary. The manufacturer warrants its products against defective parts and workmanship, and will replace or repair equipment returned to the manufacturer for these reasons within 12 months after purchase date. See manufacturer's Standard Terms and Conditions on the invoice for complete details. Please note that no other warranties, written or implied, will be honored by the manufacturer.

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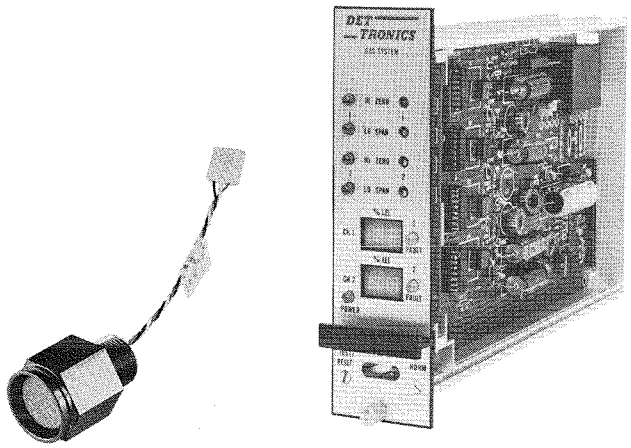
APPLICATION

The R8466/C7061C Combustible Gas Detection System continuously monitors two separate locations for potentially explosive levels of combustible gases and vapors. The system operates in the range of 0 to 100% LEL (lower explosive limit) and will respond to a variety of combustible gases. When the level of gas being detected exceeds the pre-set alarm thresholds, the controller energizes alarm relays for controlling external alarm devices. Actuation of the relays is indicated by LEDs on the front panel of the controller and the level of gas being detected is displayed on digital displays. Should a system wiring problem or an excessive negative zero drift condition occur, automatic fault detection circuitry causes a Fault relay to be de-energized and indicates the channel affected by illuminating an LED.

FEATURES

- Two independently adjustable and field selectable alarm threshold levels for each channel.
- Two latching form C (normally open/normally closed) Alarm relays for each channel.
- Current output feature (4 to 20 ma) allows monitoring of gas concentration through external remote devices.
- Fault circuitry checks detector for open sensing element, excessive negative zero drift, and continuity of interconnecting wiring.
- Form C Fault relay.
- Alarm condition is indicated by front panel LEDs.
- Digital displays indicate the level of gas being detected.
- Front panel accessibility for calibration adjustments.
- Calibration can be performed using a wide variety of calibration gases and gas concentrations. (Factory calibration with methane is standard.)
- Test mode disables alarm outputs to prevent actuation while testing the system.



- The controller can indicate a negative zero drift condition on the digital display when the controller is in the Test mode.

DESCRIPTION

The Det-Tronics dual channel gas detection system consists of an R8466 Controller and two C7061C Detectors.

C7061C DETECTOR

The C7061C Combustible Gas Detector uses a catalytic sensing element (pellistor) to detect combustible gases or vapors. When combustible gas is present, the resistance of the active sensing element increases in proportion to the concentration of the gas being detected. This change in resistance of the active element, relative to a temperature compensating reference element, is used by the controller to determine the LEL percentage of the gas at the detector.

The sensing element is mounted in an explosion-proof housing, which is designed to meet most national and international standards relating to use in hazardous areas. (See "Specifications" section.)

The C7061C has been designed for use with methane gas, but with proper calibration it can be used to detect nearly any combustible gas. Contact the Field Support Group at Detector Electronics for assistance in adapting the C7061C to a specific application.

R8466 CONTROLLER

The R8466 Controller has two independent channels. Each channel has both a low and a high alarm threshold (setpoint) and corresponding Low and High Alarm relays. The alarm thresholds are individually programmed for each channel and are adjustable between 7 and 40% LEL for the low alarm and from 10 to 60% LEL for the high alarm. The controller continuously monitors the detectors and energizes the Alarm relays in response to a level of gas that exceeds the respective thresholds. Relay actuation is indicated by LEDs on the front panel of the controller. The relays remain latched on and the LEDs remain illuminated until the controller is manually reset.

Front Panel

The front panel provides a switch for selecting mode of operation, potentiometers for recalibrating the system, LEDs for indicating output actuation, and digital displays for indicating the level of gas at the detectors. Figure 1 illustrates the front panel of the R8466.

1. The HI LED is illuminated when the high threshold is exceeded and the High Alarm relay is energized (Normal mode).

2. The LO LED is illuminated when the low threshold is exceeded and the Low Alarm relay is energized (Normal mode).

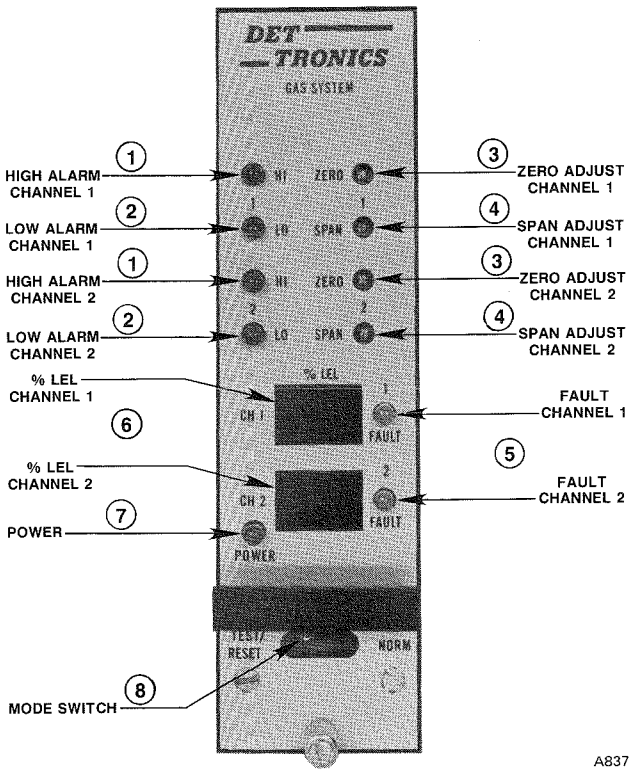


Figure 1—R8466 Front Panel

3. The ZERO potentiometer is adjusted to obtain a "0" reading on the digital display when clean air is applied to the detector (Test mode).

4. The SPAN potentiometer is adjusted to obtain a reading equal to the value of the calibration gas (Test mode).

5. Illumination of the FAULT LED indicates that the controller is in the Test mode, or that a wiring problem or excessive negative zero drift condition exists when the controller is in the Normal mode.

6. The % LEL display indicates the level of gas being detected.

7. The POWER LED is illuminated when power is applied to the system.

8. The two-position switch selects NORMAL or TEST/RESET mode.

Digital Meters

The controller provides a separate digital display for each channel for indicating the actual concentration of combustible gas being detected. When the level of gas at the detector reaches 5% LEL, the digital meter for that channel is automatically activated (in Normal mode). The display continues to indicate the concentration of gas until the LEL percentage again returns below 5% LEL, regardless of whether or not an alarm was generated. The digital display indicates a level of gas up to 99% LEL. At 100% LEL, an "EE" reading is displayed to indicate that the level of gas at the detector has reached the lower explosive limit. In the Test mode, the meters operate continuously and can be used to test the system for proper operation and correct calibration.

NOTE

Inaccurate readings in high levels of combustible gases are an inherent problem with catalytic type sensing devices. The user must exercise caution if the controller indicates an off scale reading, since a highly explosive condition could exist. The hazardous area should be checked with a portable detection instrument to determine the actual level of combustible gas present.

Current Output

A 4 to 20 milliampere current output is provided for applications that require continuous supervision of the detector by devices in addition to the controller. A 4 milliampere output corresponds to 0% LEL and a 20 milliampere output indicates a 99% LEL gas concentration.

Fault Detection

The controller features a fault detection circuit that continuously checks the detectors for an open sensing element or wiring continuity faults. In addition, the controller monitors the detectors for excessive negative zero drift and generates a fault output if zero drift reaches −10% LEL. If a fault is detected, the normally energized Fault relay is de-energized and a FAULT LED identifies the channel that is affected. The output is non-latching, therefore, the Fault relay and Fault LED automatically return to their normal state when the problem is corrected. While a system fault condition exists, the Alarm relays are inhibited and no alarm output will be generated. However, if an alarm condition was established before the fault occurred, the fault will not clear the alarm output.

Mode Select Switch

The two position switch allows the controller to be placed in either of two modes. In the **Normal** mode, the Alarm relays are de-energized and the Fault relay is energized (no faults or gas detected). The digital displays and all LEDs except the POWER LED are off. The **Test** mode prevents all relays from being energized, permitting calibration or manual testing of the system without securing the output devices that are connected to the Alarm relays. The normally energized Fault relay is de-energized and the FAULT LEDs are illuminated. The digital meters operate continuously, regardless of the level of gas at the detectors. If a negative zero drift condition exists, it is indicated by a minus sign (−) in the left hand digit of the digital meter. A minus sign in both digits (−−) indicates negative zero drift in excess of −9% LEL. The HI and LO LEDs are non-latching in the Test mode and are illuminated if the level of gas at the detector exceeds an alarm threshold. The controller is reset by placing the switch in the TEST/RESET position and then returning it to the NORMAL position.

Field Wiring Connectors

Each of the two printed circuit boards in the R8466 Controller has a wiring connector for attaching external wiring. The connectors consist of two separate pieces. One is soldered to the printed circuit board at the factory. The other contains the screw terminals for attaching the field wiring. By unplugging the connectors, the controller can be removed from the mounting cage without disturbing the wiring.

Operating Power

The R8466 Controller is wired for operation using a 20 to 35 vdc power source. Controllers that operate with either 120 volts ac or 240 volts ac are also available. By connecting a 24 vdc battery and charger to terminals 8 and 9 of the power supply board, the system can provide uninterrupted protection in the event of a power failure. (A diode in the controller prevents discharge of the battery as long as the battery voltage does not exceed 28 vdc.)

SPECIFICATIONS

OPERATING VOLTAGE—
24 vdc nominal with a 20 to 35 vdc range (standard); 120 or 240 vac, +10%, -15% (optional).

POWER CONSUMPTION—
Controller (both channels in use)
Normal: 9.7 watts, minimum cable length;
15.6 watts, maximum cable length.
Alarm: 12.2 watts, minimum cable length;
18.2 watts, maximum cable length.

Detector
0.9 watts.

CONTROLLER OUTPUTS—
Form C (normally open/normally closed) relay contacts are rated 3 amperes at 24 vdc or 120/240 vac.

CONTROLLER TEMPERATURE RANGE—
Operating: +32°F to +140°F (0°C to +60°C).
Storage: −67°F to +170°F (−55°C to +77°C).

DETECTOR TEMPERATURE RANGE—
Operating: −40°F to +167°F (−40°C to +75°C).
Storage: −67°F to +185°F (−55°C to +85°C).

DIMENSIONS—
See Figure 2 for dimensions of the R8466 Controller, Figure 3 for the C7061C Detector, and Figure 4 for the DE3698 Junction Box.

ENCLOSURE MATERIALS—
Detector: Anodized aluminum or 316 stainless steel.
Junction box: Aluminum cap, corrosion resistant alloy base.

C7061C DETECTOR ENCLOSURE RATINGS—
FM approved for Class I, Groups C and D. CSA certified for Class I, Groups A, B, C and D.

DE3698 ENCLOSURE RATINGS—
FM approved and CSA certified for Class I, Groups C and D. Contact the Field Support Group at Detector Electronics for installation assistance in Group A and B locations.

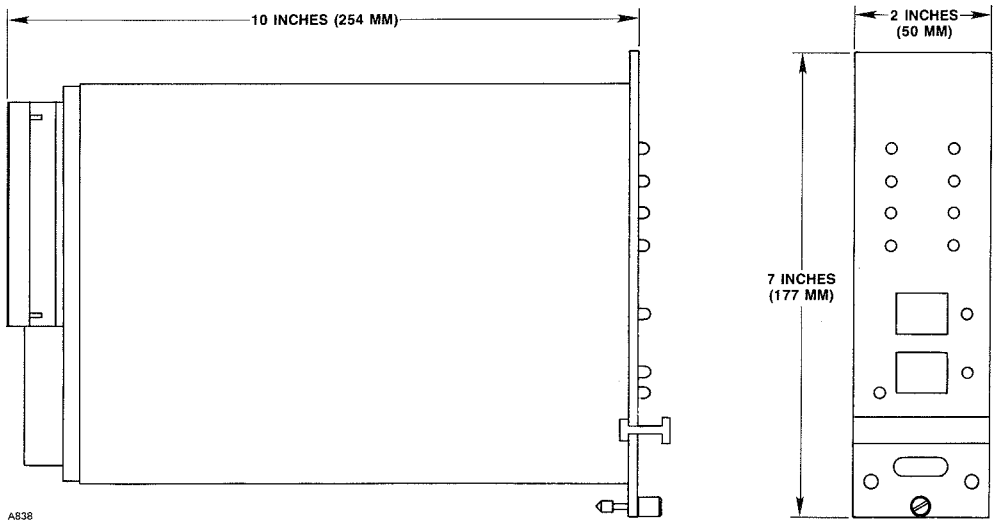


Figure 2—R8466 Dimensions in Inches (Millimeters)

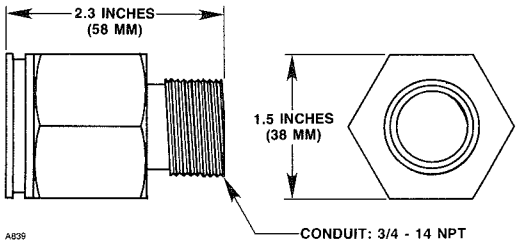


Figure 3—C7061C Dimensions in Inches (Millimeters)

SHIPPING WEIGHT (Approximate)—

	Pounds	Kilograms
Controller	4.4	2.0
Detector (aluminum)	0.5	0.2
(stainless steel)	1.0	0.4
Junction box	3.5	1.0

REPEATABILITY—

±5 percent, full scale.

ACCURACY—

CSA tested for ±3 percent full scale up to 2.5 percent methane gas by volume in air, ±5 percent full scale up to 5 percent methane gas by volume in air. FM tested for ±3 percent full scale up to 2.5 percent methane gas by volume in air, ±10 percent full scale up to 5 percent methane gas by volume in air.

RESPONSE TIME (with full scale gas applied)—

10 seconds to reach 50 percent of value of applied gas and 30 seconds to reach 90 percent of value of applied gas.

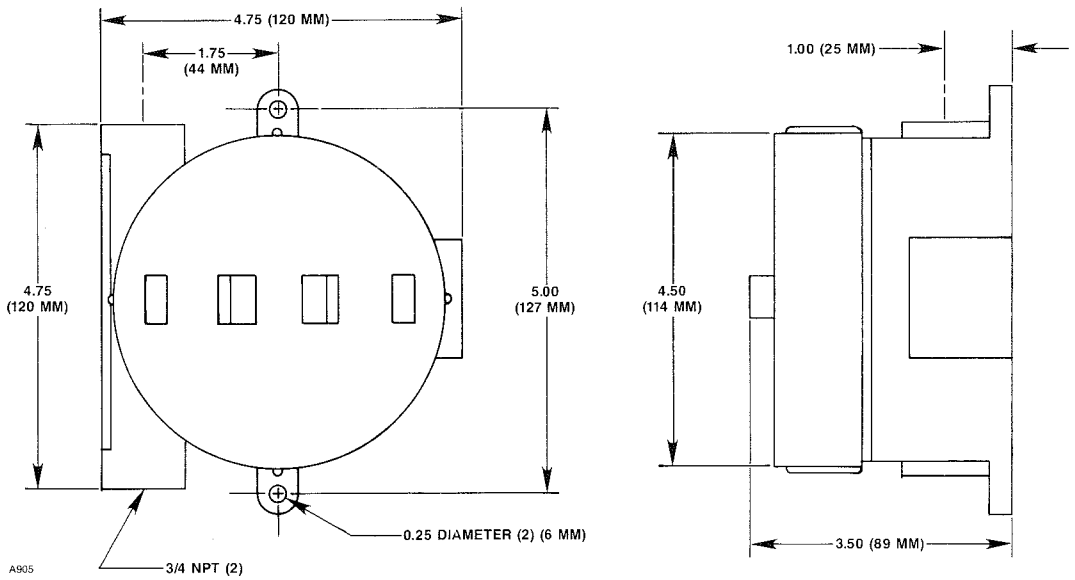


Figure 4—Junction Box Dimensions in Inches (Millimeters)

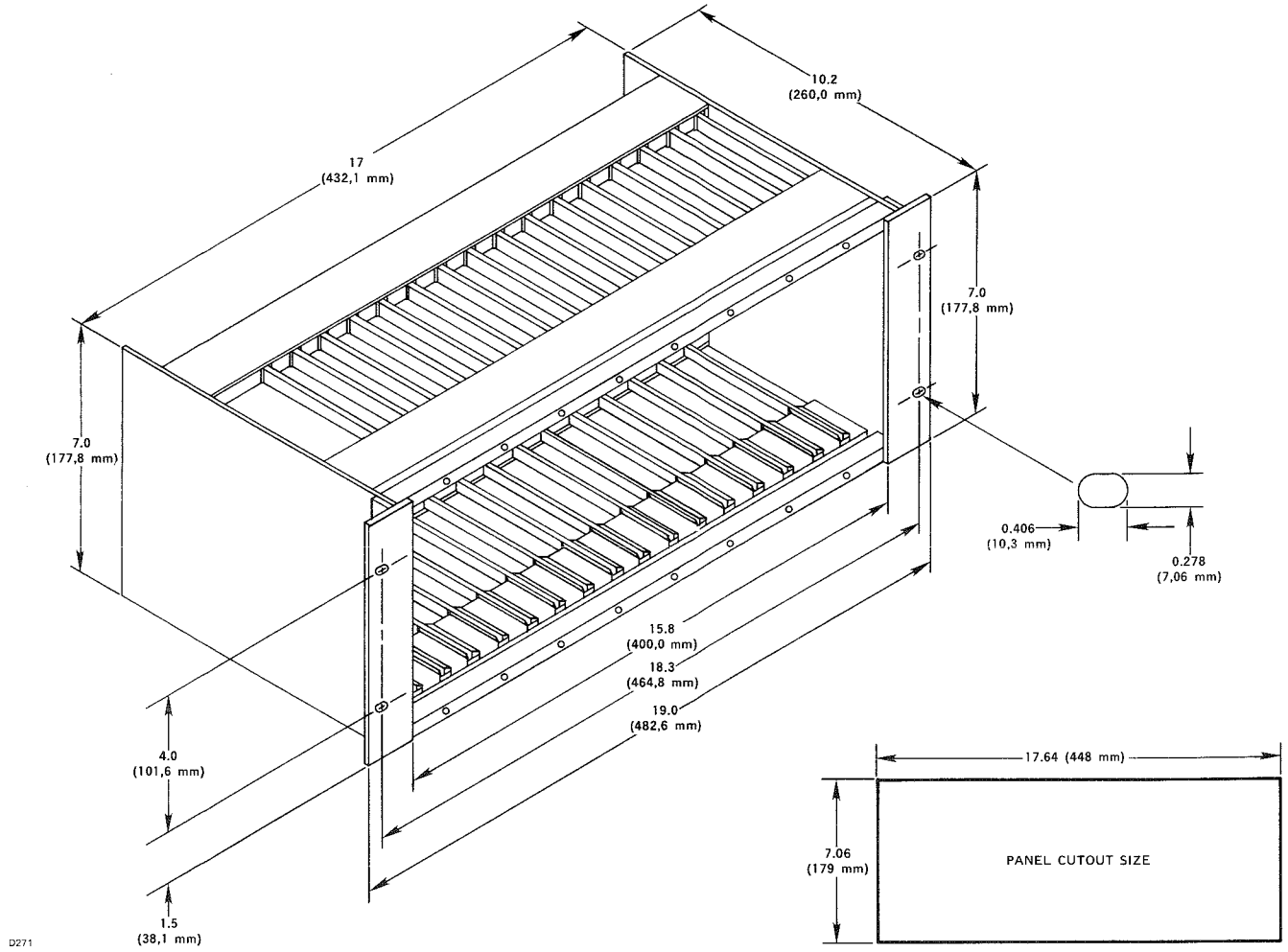


Figure 5—Q4004 Mounting Cage Dimensions in Inches (Millimeters)

OXYGEN EFFECTS—

The detector will operate with the oxygen level in the atmosphere down to about 10 percent. Under oxygen enriched conditions the detector will respond, but the user should beware of an increase in the explosive hazard.

HUMIDITY EFFECTS—

±5 percent full scale at 32°F (0°C) with 30 to 70% RH.
±5 percent full scale at 104°F (40°C) with 85 to 95% RH.

WARRANTY

Detector Electronics warrants its catalytic gas detectors to be free of defects in materials or workmanship and will repair or replace without charge any detector that is found to be defective for two years after the date of purchase. Gas detection elements that are damaged by exposure to poisoning contaminants or to a high level of combustible gas are not covered by this warranty. Det-Tronics reserves the right to make the final determination of the nature of and responsibility for defective or damaged equipment. Equipment that has been repaired or modified by the user, damaged as the result of an accident, incorrectly installed, or used in an environment or application for which it was not intended is not included in this warranty. Det-Tronics' responsibility under this warranty shall be limited to the repair or replacement of the defective equipment at their option when it is returned to the factory transportation prepaid. The defective unit will be repaired or replaced free of charge to the customer and returned transportation prepaid. In all cases this warranty is limited to the cost of the equipment.

POISONOUS MATERIALS—

The following is intended to aid the user of the gas detection system in identifying those substances that will poison (permanent loss of sensitivity) or inhibit (temporary loss of sensitivity) the gas sensing element. By no means should this be considered a complete list. Substances that may act as poison on the catalytic gas sensing element include silicone compounds often found in oils, greases, and resins. Antiknock compounds such as tetra ethyl lead and tetra methyl lead, phosphate esters, as well as hydrogen sulfide and other sulfur based compounds are also known poisons.

Inhibition of the sensing element can be caused by volatile halogenated compounds, tetrachlorethylene, HCL, fluorinated hydrocarbons, antiseptics, and hot P.V.C.

OPTIONS

- AC input power can be ordered for applications where 24 vdc is not readily available. Systems that operate with 120 or 240 vac are available.

- The C7061C Detector housing is available in anodized aluminum or 316 stainless steel.

ACCESSORIES

- The Q4004 Mounting Cage, illustrated in Figure 5, is designed for holding up to eight modules in a standard 19 inch instrument rack and is recommended for ease of installation and service. See form 95-8241 for additional information. Mounting cages that hold fewer modules are also available.

- Filler panels (part number 002188-001) are available to cover unused sections of the mounting cage.

- W4110 Power Supply provides dc power for up to 6 controllers and 12 detectors (see form 95-8290).*

- A weather protection device is available to prevent water and other foreign materials from clogging the sintered metal flame arrestor and restricting the flow of gas to the sensing element.*

- A cone collector is available to aid in detecting gases that are lighter than air.*

INSTALLATION

DETECTOR POSITIONING

If the gas detection system is to provide maximum protection, it is essential that the detectors be properly positioned. Unfortunately, there is no fool-proof formula for determining the most effective number and placement of detectors. No two installations will be exactly alike. Therefore, the individual who is responsible for the installation must rely on experience and common sense to determine the best detector locations for the area to be protected.

Several factors should be considered for every installation:

1. What kind of gas is to be detected? If it is lighter than air, place the detectors close to the ceiling. Place them close to the floor for gases having a density greater than the surrounding air or for vapors resulting from flammable liquid spills.

2. How rapidly will the gas diffuse into the air? Select a location for the detector as close as practical to the anticipated source of a gas leak.

3. Ventilation characteristics of the immediate area must also be considered. Movement of air will cause gas to accumulate more heavily in one area than another. The detectors should be placed in the areas where the most concentrated accumulation of gas is anticipated. Also take into consideration the fact that many ventilation systems do not operate continuously.

4. Water, dirt, or other non-gaseous materials must not be permitted to accumulate on the sintered metal screen that covers the gas inlet and restrict the flow of gas to the sensing element. The use of a filter is recommended in "dirty" applications.

5. The detector must be accessible for testing and calibration.

6. The detector should be located in an area where it is safe from potential sources of contamination that can poison the sensing element.

Remember, the finest gas detection system is of little value if the gas can not readily come into contact with the detectors.

WIRING REQUIREMENTS

The detectors are connected to the controller using a three wire cable. Shielded cable is recommended to protect against interference caused by extraneous electrical "noise". Each detector has its own individual wiring cable. The maximum wiring distance from the detector to the controller is determined by the resistance of the wire, which is a function of wire diameter. The resistance of the total loop (positive lead plus the negative lead) must not exceed 40 ohms. For example, if 14 gauge (2.08 mm^2) wire is used, the maximum wiring distance is approximately 8000 feet (2440 meters). Using 18 gauge (0.825 mm^2) wire reduces the wiring distance to about 3000 feet (910 meters). When using 22 gauge (0.325 mm^2) wire, the cable should not exceed approximately 1200 feet (365 meters).

In applications where the wiring cable is installed in conduit, the conduit should not be used for wiring to other electrical equipment. Since moisture can be detrimental to electronic devices, it is important that moisture not be allowed to come in contact with the electrical connections of the detector. Moisture in the air can be trapped within sections of conduit, therefore the use of conduit seals is required to prevent damage to electrical connections caused by condensation within the conduit. These seals

*Not FM approved.

must be watertight and explosion-proof and are to be installed even if they are not required by local wiring codes. A seal must be located as close to the detector as possible. In no case should this seal be located more than 18 inches (457mm) from the junction box. When local codes require an explosion-proof installation, an additional seal is also required at any point where the conduit enters a non-hazardous area. When pouring a seal, the use of a fiberdam is required to assure proper formation of the seal. The seals should never be poured in temperatures that are below freezing, since the water in the sealing compound will freeze and the compound will not dry properly. Contamination problems can then result when temperatures rise above the freezing point and the compound thaws. The shielding of the cable should be stripped back to permit the seal to form around the individual leads, rather than around the outside of the shield. This will prevent any siphoning action that might occur through the inside of the shield.

CONTROLLER

The R8466 Controller is designed to be mounted in a non-hazardous area. It should be mounted in a location that provides adequate ventilation and minimum exposure to shock and vibration. See the "Specifications" section for mounting dimensions of the controller.

The caution label that is supplied with the controller, which states that only qualified personnel are to operate or service the controller, must also be installed. This label should be located as close to the controller as possible and must be clearly visible.

NOTE

The R8466 Controller contains several semiconductor devices that are susceptible to damage by electrostatic discharge. An electrostatic charge can build up on the skin and discharge when an object is touched. Therefore, the controller should be handled carefully, taking care not to touch the terminals or electronic components. For more information on proper handling of the controller, a Service Memo (form 75-1005) has been included with the controller.

AC controllers must be installed in an enclosure with key or tool access and the enclosure must be grounded.

DETECTOR

Follow the procedure described below for mounting and wiring the gas detectors.

1. Detectors should be mounted in a location that is best suited for covering the area to be protected, following the previously discussed guidelines for detector positioning. Whenever practical, they should be placed where they are easily accessible for calibration.

2. Attach the detector to the junction box and plug it in as illustrated in Figure 6. Note that the plug is keyed to aid in correct installation.

3. Connect the three wire connecting cable to the screw terminals (white to "+", red to "signal", black to "–").

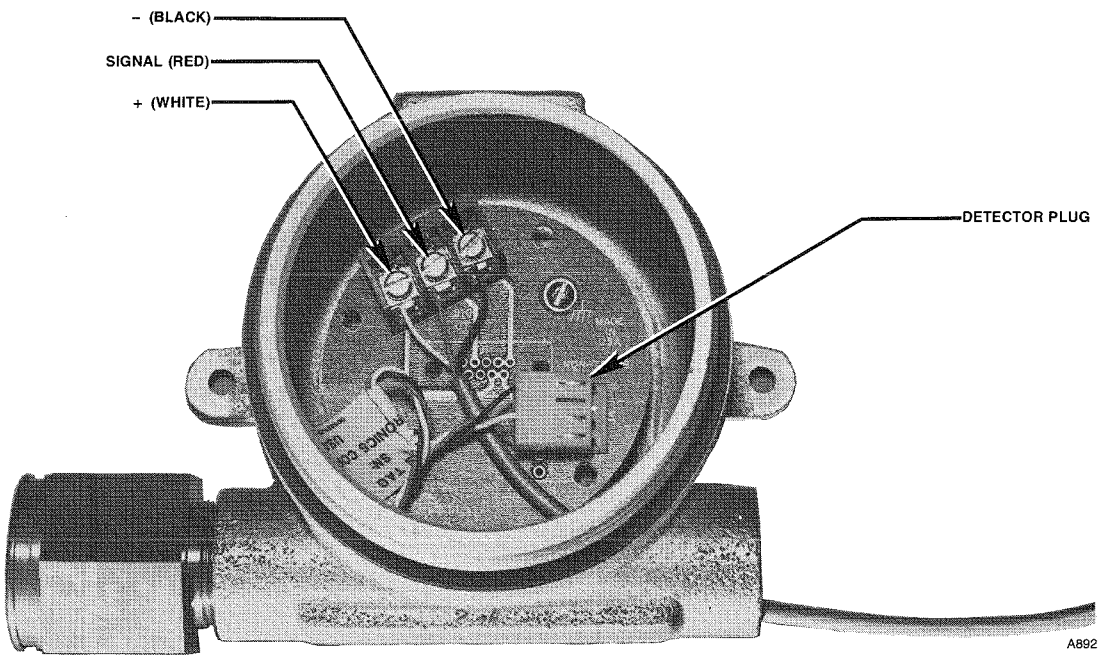


Figure 6—Junction Box

Do not ground the shield (if a shield is used) at the detector. Always insulate the shield from the detector housing and ground the shield at the controller only.

4. Pour the conduit seals (if conduit is used). Place the cover on the junction box.

NOTE

The wiring procedures in this manual are intended to ensure proper functioning of the device under normal conditions. However, because of the many variations in wiring codes and regulations, total compliance to these ordinances can not be guaranteed. Be certain that all wiring complies with the applicable regulations that relate to the installation of electrical equipment in a hazardous area. If in doubt, consult a qualified official before wiring the system.

ELECTRICAL CONNECTIONS

Electrical connections are made to the field wiring connectors that are furnished with the controller. Figure 7 shows the terminal configuration for the R8466.

NOTE

When cutting the wires that will be attached to the terminal connectors on the controller, leave enough excess wire to allow the controller to be removed from the mounting cage with the wires attached. This will facilitate removal or re-installation of the wiring, as well as allow potentiometer adjustments with the power on.

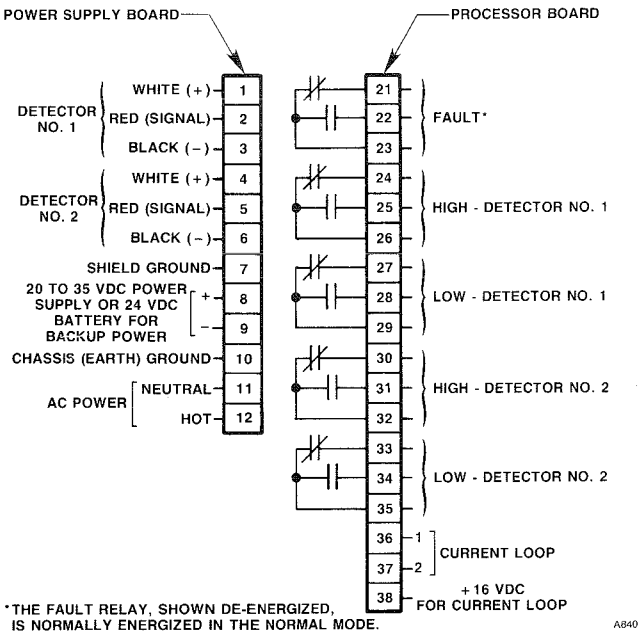


Figure 7—Terminal Configuration of the R8466 Controller

Power Supply Board

Terminals 1 to 3— Connect to detector number 1: White lead (+) to terminal 1, Red lead (signal) to terminal 2, Black lead (–) to terminal 3.

Terminals 4 to 6— Connect to detector number 2: White lead (+) to terminal 4, Red lead (signal) to terminal 5, Black lead (–) to terminal 6.

NOTE

When only one detector is used with the R8466 Controller, two 1 ohm, 1/2 watt resistors must be installed in the second detector position (see Figure 8). These resistors simulate a detector and prevent the controller from indicating a fault.

Terminal 7— The shields are connected to terminal 7 and **not** to the detectors.

Terminal 8— Connect to the positive (+) side of an external dc power supply or a battery that is used as a backup power source.

Terminal 9— Connect to the negative (–) side of the dc power source.

Terminal 10— Chassis (earth) ground. Connect to earth ground when using an ac power source.

Terminal 11— Connect to the neutral side of the ac power source.

Terminal 12— Connect to the hot side of the ac power source.

Processor Board

Terminals 21 to 23— Fault relay
21 - NC
22 - NO
23 - COM

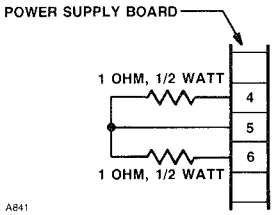


Figure 8—Using Resistors Instead of Second Detector

Terminals 24 to 26— High Alarm relay for channel 1
24 - NC
25 - NO
26 - COM

Terminals 27 to 29— Low Alarm relay for channel 1
27 - NC
28 - NO
29 - COM

Terminals 30 to 32— High Alarm relay for channel 2
30 - NC
31 - NO
32 - COM

Terminals 33 to 35— Low Alarm relay for channel 2
33 - NC
34 - NO
35 - COM

Terminals 36 and 37— Current loop outputs. Connect external current monitoring devices as shown in Figure 9. The total resistance from terminal 38 to either terminal 36 or terminal 37 must not exceed 200 ohms.

Terminal 38— +16 vdc power source for use with the 4 to 20 milliampere current loop.

In the Normal mode, the Fault relay is energized and the Alarm relays are de-energized (no faults or alarms).

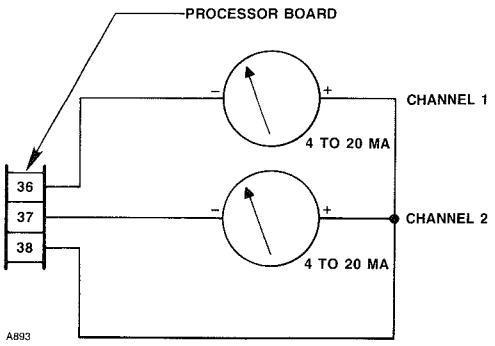


Figure 9—External Current Monitoring Devices

TYPICAL SYSTEM APPLICATION

The following typical application is an example only. For assistance in adapting a system to your individual requirements, contact the Field Support Group at Detector Electronics.

Two C7061C Detectors are connected to terminals 1 through 6 of the controller as shown in Figure 10. If shielded cable is used for wiring the detectors, the shields are connected to terminal 7 of the power supply board.

The system in this example is powered by ac, with the hot side connected to terminal 12 and the neutral side connected to terminal 11 of the power supply board. The chassis (earth) ground wire of the line cord is connected to terminal 10. This system uses a 24 volt battery as a backup power source. A 24 vdc charger is used to maintain the battery charge. (A dc powered controller will have no connections to terminals 11 and 12.)

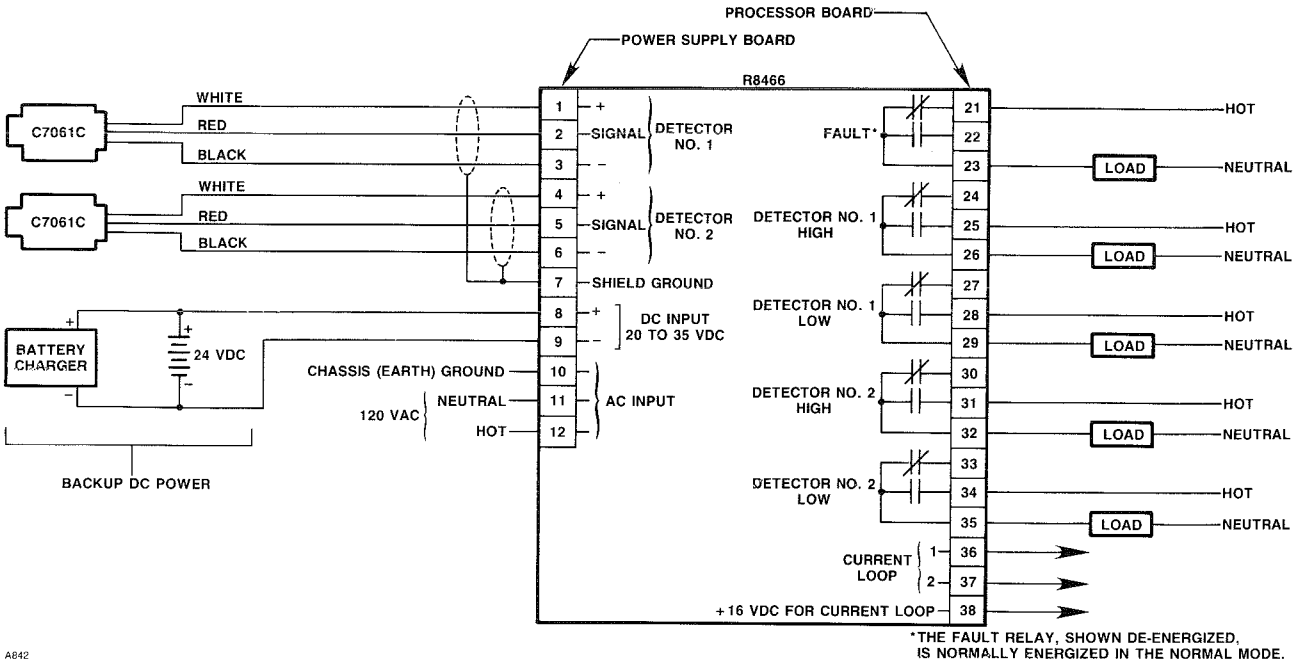


Figure 10—A Typical Two Channel Combustible Gas Detection System

An annunciation device is connected to the Fault relay to indicate a system fault. Note that the connection is made to terminal 21, since the relay is normally energized in the Normal operating mode. Alarm indicating devices are connected to the normally open contacts of the Alarm relays to provide an audible or visual indication that an alarm threshold has been exceeded. The current loop outputs are accessible at terminals 36 and 37 of the processor board, with terminal 38 providing the +16 volts dc.

STARTUP PROCEDURE

1. Output loads that are normally actuated by the gas detection system should be secured (remove power from all output devices) to prevent undesired activation of these devices.

2. After the electrical connections have been made to the terminal connectors, plug the controller into the connectors.

3. Double check to be sure that all external wiring has been installed properly and that the wiring connectors have been connected properly. Then apply power to the controller.

4. Check for correct setting of the alarm threshold levels (see "Setting Alarm Thresholds").

5. Perform the calibration procedure.

6. Remove mechanical blocking devices (if used) and restore power to the output loads.

NOTE

After power is applied to the system, the R8466 Controller has been designed to "wait" for thirty seconds before beginning normal operation. During this time, all outputs are inhibited and the FAULT LEDs are illuminated. This delay allows the detector adequate time to properly "warm up" before beginning normal operation.

SETTING ALARM THRESHOLDS

Each channel must be programmed for its own individual low and high alarm thresholds. The low threshold is adjustable from 7 to 40% LEL. The high threshold is adjustable between 10 and 60% LEL. The factory settings are 20% LEL for the low alarm threshold and 40% LEL for the high threshold.

To check the alarm threshold settings:

1. Place the mode select switch in the TEST/RESET position.

2. Turn the ZERO adjust potentiometer for the channel under test clockwise until its LO LED turns on. (The potentiometer is located at the front panel of the controller, as illustrated in Figure 1.) The digital display now indicates the low alarm setting. Continue turning the potentiometer until the HI LED also turns on. The digital display now indicates the high threshold. Turn the potentiometer counterclockwise to again obtain a zero reading on the digital display. (The alarm threshold levels should be recorded for future reference.)

NOTE

If the alarm threshold levels can not be reached by adjusting the ZERO potentiometer, an adjustment to the SPAN potentiometer is also required. If the SPAN setting is changed, recalibration MUST be performed before the system is placed in service.

To change the alarm thresholds:

3. Slide the controller out of the mounting rack far enough to permit access to the threshold adjustment potentiometers on the Processor Board. See Figure 11 for location and identification of potentiometers.

NOTE

The setting of the fault potentiometers (R58 and R61) determines the point at which a negative zero drift fault is generated. The factory setting is −10% LEL and does not require field adjustment in most applications. If a different fault threshold is desired (−5% to −15% LEL), consult the Field Support Group at Detector Electronics for information regarding the adjustment. When adjusting the alarm thresholds, use care not to inadvertently change the setting of the fault potentiometers.

4. Adjust the ZERO potentiometer for the appropriate channel to obtain the desired low alarm threshold reading on the digital display.

5. If the LO LED is illuminated, turn the low threshold adjustment potentiometer on the processor board (R60 for channel 1 or R63 for channel 2) clockwise until the LO LED goes out. Slowly turn the potentiometer counterclockwise until the LO LED just turns on.

6. Adjust the ZERO potentiometer to obtain the desired high alarm threshold reading on the digital meter.

7. If the HI LED is on, turn the high adjustment potentiometer (R59 for channel 1 or R62 for channel 2) clockwise until the LED goes out. Turn the high adjustment potentiometer counterclockwise until the HI LED just comes on.

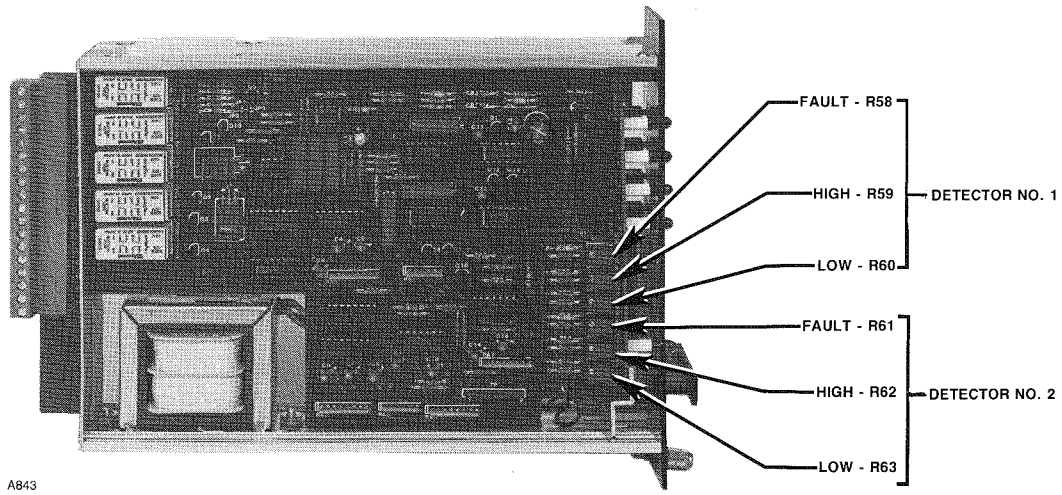


Figure 11—Location of Threshold Adjustment Potentiometers

8. Adjust the ZERO potentiometer for a zero reading on the digital display.

9. Repeat step 2 to check the new settings.

10. When the desired thresholds have been obtained, adjust the ZERO potentiometer for a zero reading on the digital meter.

11. Follow the same procedure to check or adjust the alarm thresholds for the second channel.

12. When the desired threshold settings have been obtained, calibrate the detectors.

CALIBRATION

Different factors affect the time interval between periodic recalibrations. Exposure to certain contaminants in the air, exposure to a high concentration of combustible gas, or even an extended period of normal operation can cause changes in the sensitivity of the sensing element. Since each application is different, the appropriate time interval between regularly scheduled recalibrations must be determined for each individual installation.

Because the sensitivity of the detector to different types of gases can vary considerably, it is recommended that calibration always be performed using a gas/air mixture of the gas that is intended to be detected. The use of other gases is not recommended, since significant calibration errors can result. If a calibration mixture of the gas to be detected is not available, the system can be calibrated using methane. Contact the Field Support Group at Detector Electronics for details.

For greatest accuracy, always calibrate the detector using a gas/air mixture between 30 and 60% LEL. Calibrate the system as follows:

1. Place the mode switch in the TEST/RESET position. The outputs are inhibited and the digital display is activated.

2. With only clean air present at the detector being calibrated, adjust the ZERO potentiometer (located on the faceplate of the controller) for a zero reading.

3. Use a calibration kit to apply the calibration gas to the detector. When the reading on the digital display stabilizes (about two minutes), adjust the SPAN potentiometer to display the LEL percentage of the calibration gas.

4. Remove the calibration gas from the detector.

NOTE

It is recommended that steps 2 and 3 be repeated to ensure accurate calibration.

5. Calibrate the second channel in the same manner. If resistors have been installed instead of a second detector, perform step number 2 to prevent the controller from producing a false alarm.

6. Allow the reading on the digital displays to return to zero (at least below the alarm thresholds) before returning the mode switch to the NORMAL position. This will prevent actuation of the controller outputs.

MAINTENANCE

The gas detection system requires virtually no routine maintenance, except for periodic checks to assure proper system function and calibration. The frequency of these checks is determined by the requirements of the particular installation.

NOTE

Exposure to a high level of gas can have an adverse effect on the sensitivity of the sensing element. If the level of gas at the detector should reach 100% LEL (digital display reads "EE"), it is important that the affected detector be tested and recalibrated or replaced as required.

MANUAL CHECK OF OUTPUT DEVICES

Fault circuitry in the R8466 Controller continuously monitors the system for an open sensing element, excessive negative zero drift, and open or shorted interconnecting wiring. It does not, however, monitor external equipment that is activated by the controller outputs. It is important that these devices be checked initially when the system is installed, as well as periodically during the ongoing maintenance program.

CHECKOUT IN TEST MODE

Proper operation of the system can be verified by applying gas to the detectors with the controller in the Test mode. The digital displays are illuminated and indicate the level of gas at each detector. With clean air at the detector, the digital meter should read zero. A minus (–) in the left hand digit indicates a negative zero drift condition. A minus in both digits indicates a negative zero drift condition that exceeds –9% LEL. With a test gas (such as the gas/air mixture used for calibration) applied to the detector, the digital meter displays the LEL percentage of the gas. (Apply the gas for approximately two minutes or until the reading stabilizes.) The appropriate alarm LED is illuminated if its corresponding threshold is exceeded. If the readings that are obtained are not within approximately 10 percent (or as required for the specific application), the system should be recalibrated.

CHECKOUT IN NORMAL MODE

The entire system should be periodically checked in the Normal mode to ensure that gas at the detector can cause the controller to energize an output.

CAUTION

Be sure to secure all output devices that are actuated by the controller to prevent unwanted activation of this equipment, and remember to place these same output devices back into service when the checkout is complete.

A test form is supplied with this manual for recording maintenance performed on the system.

TROUBLESHOOTING

Table 1 is intended to serve as an aid in locating the cause of a system malfunction.

Table 1—Troubleshooting Guide

Failure	Possible Cause
No POWER LED	1. Input power failure 2. Wiring to external power source 3. Controller power supply failure
FAULT LEDs on after warmup	1. Mode switch in TEST/RESET position 2. Low input voltage 3. ZERO adjustment 4. Detector wiring problem
Alarm LEDs on, no actuation of outputs	1. Mode switch in TEST/RESET position 2. Output circuit failure
FAULT LED on, % LEL display reads "– –" in Test mode	1. ZERO adjustment 2. Detector wiring problem 3. Faulty detector
Zero or Span value cannot be reached during calibration	1. Poisoned or defective detector

REPLACEMENT PARTS

The R8466 Controller is not designed to be repaired in the field, but should be returned to the factory for any necessary repairs. Therefore, replacement parts for the controller are not needed.

The sensing element in the C7061C is mounted in a sealed housing and is not intended to be repaired or replaced. When calibration can no longer be properly performed, the C7061C must be replaced. The frequency of replacement will be determined by the amount and type of contamination present at a particular installation.

An adequate supply of spare detectors should be kept on hand at all times. For maximum protection against contamination and deterioration of the sensing element, the detector should not be removed from the original protective packaging until it is needed for installation in the

field. This packaging is designed to provide protection from contamination for an indefinite period of time.

Always calibrate the affected channel after replacing a detector.

DEVICE REPAIR AND RETURN

Prior to returning devices or components, contact the nearest local Detector Electronics office so that an RMI (Return Material Identification) number can be assigned. A written statement describing the malfunction must accompany the returned device or component to expedite finding the cause of the failure, thereby reducing the time and cost of the repair to the customer.

Return all equipment transportation prepaid to the Minneapolis location.

Office locations

Detector Electronics Corporation
6901 West 110th Street
Minneapolis, Minnesota 55438 USA
Telephone (612) 941-5665
Telex 29-0562 DETRONICS BLTN or 6879043 DETEL UW
Cable Detronics
Telefax (612) 829-8750

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Suite 145
Houston, Texas 77042 USA
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3505 - 29th Street Northeast
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Telex 72008

In Rotterdam Telephone 31 10436 2777

Detector Electronics Europe S.r.l.
Via Trivulzio nº 30
20146 Milan
ITALY
Telephone 02-4048641 or 02-4048642
Telex 312625

Detronics A/S
P.O. Box 27
1322 Hovik
NORWAY
Telephone 47-2124305
Telex 77783

ORDERING INFORMATION

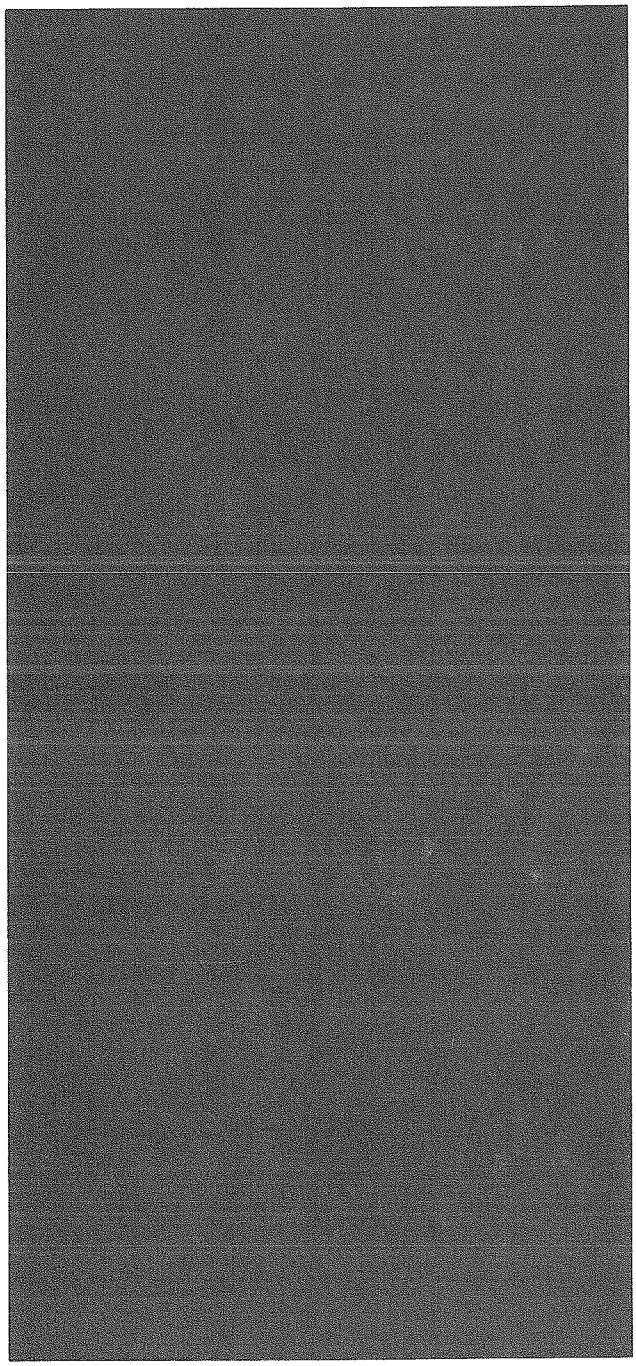
When ordering, please specify:
—R8466 Controller
—C7061C Detector
—DE3698 Junction Box
—Number of detectors
—Detector enclosure material
  anodized aluminum
  316 stainless steel
—Cover locking assembly (if needed to meet local regulations)

For assistance in ordering a system to fit your application, please contact:

Detector Electronics Corporation
Field Support Group
6901 West 110th Street
Minneapolis, Minnesota 55438 USA
Telephone (612) 941-5665
Telex 29-0562 or 6879043
Cable Detronics
Telefax (612) 829-8750

Recommended Test Form

Detector Number	Detector Location	Date Installed	Date Checked	Date Calibrated	Remarks



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