REGAL SERIES 3000 GAS DETECTOR

GENERAL

The REGAL Series 3000 Gas Detector (monitor) shall use microprocessor based electronics and shall be capable of accurately sensing and displaying the presence of free chlorine or free sulfur dioxide in the environment at levels below those mandated by OSHA throughout the working life of the sensor or sensors used. The detector (monitor) enclosure shall be NEMA 4X. The sensor enclosures shall be water tight, UL approved, and RFI/EMI protected.

THEORY OF OPERATION

A regulated voltage of 24 VDC is provided over a two wire shielded cable to the sensor(s) from the detector's (monitors) main power supply. The sensor transmitter board shall convert the sensor cell output, which is representative of the chlorine or sulfur dioxide gas concentration, to a 4-20 milliamp, DC output signal for transmission to the receiver board. The receiver board shall convert the analog current signal to a continuous pulse train for processing by the microcontroller.

The monitor shall scan the active sensor(s) at a rate of 1 reading each 5 seconds and shall indicate the sensor presently being scanned on a single digit readout. The gas concentration for the displayed sensor shall be indicated both on a multicolored bargraph and, on a 3 digit direct readout of gas concentration.

When the detector (monitor) is subjected to varying concentrations of chlorine gas (up to 10 PPM), or sulfur dioxide gas (up to 20PPM), the detector (monitor) displays the actual concentration on the 3 digit display. As the concentration of gas increases, the appropriate bargraph LEDs shall "blink", the internal audible alarm horn shall sound, and the appropriate WARNING relays shall engage, when passing the 1 PPM chlorine or 2 PPM sulfur dioxide (WARNING) point.

If the concentration of gas increases to the 3 PPM (DANGER) point for chlorine, or the 5 PPM (DANGER) point for sulfur dioxide, the 3 digit display shall also begin to "blink" and the appropriate DANGER relays shall latch into the alarm state. The bargraph LED representing the highest detected level MUST stay lit even as the gas concentration decreases to let the user know he had a leak (and the magnitude of the leak) even if it had cleared itself.

The alarms shall be acknowledged and reset using the keypad on the face of the monotor unit. The bargraph LEDs and the digital display shall continue to "blink" until the gas concentration subsides to normal and the system is manually reset by the operator.

When the gas detector (monitor) includes the optional back-up battery module, and during primary power failures, all display illumination shall automatically be turned off to conserve battery power except for a single LED in the bargraph to indicate the system is still functioning. All detection, alarm, and relay functions continue to operate normally. If during the power outage, the operator wishes to observe conditions on the display screen, the monitor MUST include a keypad button which when pressed, will illuminate the display for a period of just over one full scan sequence, then again automatically blank the display to continue conserving battery power.

The detector (monitor) shall include a program to simplify calibrating the gas detector (monitor) system. This program shall be used in conjunction with three sensor status LEDs located on the face of the detector (monitor). Once a calibrated gas source equal to the span value of the gas detector (monitor) is applied to the sensor input, calibration shall be accomplished by simply pressing two of the keypad buttons simultaneously. The program shall include a means to disable all alarm relay operations (by the simultaneous pressing of two keypad buttons) for a fifteen minute period during the calibration process.

The three sensor status LEDs shall visually indicate remaining sensor life as follows:

a. With all three sensor status LEDs lit, the sensor has between 75% and 100% of useful life remaining.
b. With two sensor status LEDs lit, the sensor has between 50% and 75% of useful life remaining.
c. With one sensor status LED lit, the sensor has between 25% and 50% of useful life remaining.
d. With no sensor status LEDs lit, the sensors life is below 25% and is nearing time for replacement.

An OPTIONAL Serial to Analog Converter (REGAL Model 3600) MUST be available to convert the serial data to an isolated 4-20 milliamp analog output representing the gas concentration in MG/L (PPM). SEE SPECIFICATION SHEET 3600/7600.

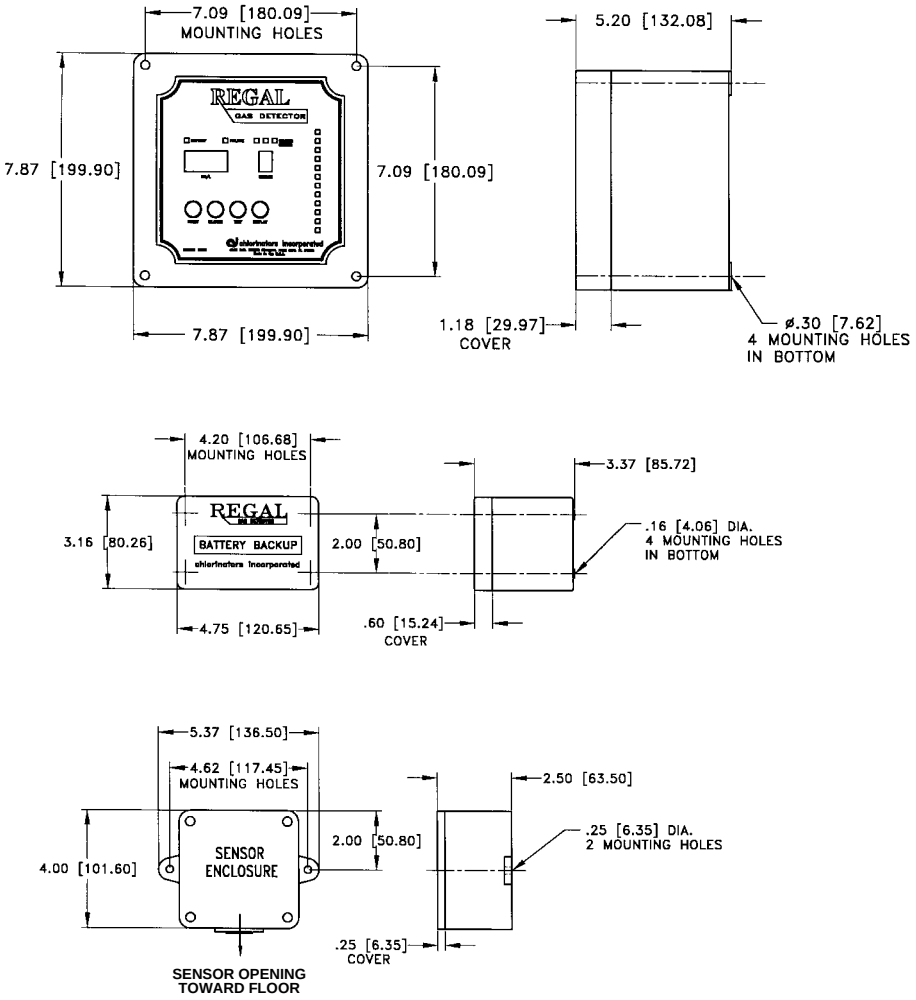
KEY FEATURES THAT MUST BE INCLUDED

1. The chlorine or sulfur dioxide gas detector MUST be capable of single or dual chlorine sensor configurations as standard.
2. MUST include a digital display on the face of the detector (monitor) to continuously display the chlorine or sulfur dioxide gas concentration being detected by the sensor(s) in PPM (Parts Per Million).

KEY FEATURES THAT MUST BE INCLUDED continued

3. MUST be capable of displaying and transmitting sensor or signal conversion failures via an LED, a designated relay (when selected via a DIP switch), and a flashing "FFL" indication on the digital display.
4. The gas concentration digital display shall flash "OFL" for readings in excess of the full scale value of 10 PPM for chlorine or 20 PPM for sulfur dioxide.
5. MUST be capable of transmitting digital information for computerized data logging via an internal RS232 port within the detector (monitor) enclosure.
6. MUST include two SPDT 5 amp warning relays and two DPDT 10 amp danger relays.
7. The relays MUST be field configurable for either normal or fail-safe relay operation.
8. Sensor cable lengths shall be 25´ standard. Cable length shall be capable of being extended up to 1000´ with no pre-amplification required.
9. All circuit board connections for customer interface shall be via polarized plugs.
10. MUST be completely stabilized and have the ability of generating correct and accurate readings within two to three minutes after the detector (monitor) is first powered up.
11. Pressing the "TEST" keypad button shall initiate a test of the internal audible alarm horn and the electrical relay circuitry by SEQUENTIALLY latching each relay to its alarm state and then SEQUENTIALLY unlatching each relay back to its normal state.
12. If chlorine or sulfur dioxide gas is detected, the highest level bargraph LED MUST remain lit (until manually reset) to let the operator know he had a leak (and the magnitude of the leak) even if the leak had cleared itself.
13. MUST include a program to simplify calibrating the detector (monitor) by simply pressing two keypad buttons simultaneously once a calibrated gas source equal to the units span value is applied to the sensor.
    a. Manufacturer of the detector (monitor) MUST be capable of furnishing a chlorine gas generator or a sulfur dioxide calibration kit.

SERIES 3000 GAS DETECTOR ENCLOSURE DIMENSIONS



    b. MUST include three (3) sensor status LEDs on the face of the detector (monitor) to provide a visual indication of remaining sensor life.
14. Whenever the detector (monitor) is furnished with the optional battery back-up module, the detector (monitor) MUST automatically enter an energy conservation mode which turns off all visual displays (except power indication) to conserve battery power whenever AC power is lost.
    a. MUST include a single pushbutton to enable the operator to momentarily turn on all faceplate visual displays at any time during the power outage then again automatically blank the display to continue conserving battery power.
15. MUST include a single LED on the face of the detector (monitor) that will "blink" whenever the back-up battery is recharging.

The chlorine or sulfur dioxide gas detector (monitor) shall be furnished with a one (1) year warranty against defects in materials and workmanship. The sensor(s) shall have a normal life expectancy of two (2) years after which time they must be replaced. The optional back-up battery (when furnished) shall have a life expectancy of three (3) years before a normal cell failure is encountered.

The chlorine or sulfur dioxide gas detector shall be a REGAL Series 3000 as manufactured by Chlorinators Incorporated located in Stuart, Florida.

chlorinators incorporated
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