Combustible Gas Detection and Control System

DESCRIPTION

Gas monitor with built-in combustible gas sensor, wall-mounted, accepts inputs from remote devices such as other gas sensors, temperature or humidity sensors.

APPLICATION

To detect and control levels of combustible gases, vapors and other gases in a wide variety of commercial and industrial applications such as boiler rooms (i.e. Methane), dry cell battery rooms (i.e. Hydrogen), gas/fuel spill locations (i.e. Gasoline, Hexane), laboratories and industries (i.e. Butane, Propane), etc. The controller can interface via binary outputs and up to (2) 4-20 mA signals with any compatible electronic analog control, DDC/PLC control or automation system.

FEATURES

- Continuous monitoring
- One (1) built-in catalytic bead (pellistor) sensor, long life
- Easy plug-in sensor
- Three (3) remote analog inputs, 4-20 mA
- Five (5) relay outputs:
  - Five-stage control
  - Fail-safe assignable
- Two (2) analog outputs, 4-20 mA
  - Selectable for low, high or averaging
- Liquid Crystal Display (LCD)
- LED status indicators

- Accepts combination of toxic or combustible gases, refrigerants, temperature or humidity remote sensor inputs
- Built-in horn
- Keypad user interface
- Simple menu-driven programming
- RFI/EMI protected
- Modular technology
- Overload & short-circuit protected
- NEMA 4X enclosure
- Easy maintenance

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Electric</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>24 VAC/VDC, -15%/+20%, 50/60 Hz, auto-resettable fuse</td>
</tr>
<tr>
<td>Power consumption</td>
<td>13 VA (0.5 A), w/max sensor connections</td>
</tr>
<tr>
<td>RF/EMI protected</td>
<td>4.0 W @ 3 ft. (1 m) radiated</td>
</tr>
</tbody>
</table>

Sensor Performance

| Gas detected | Combustible gases and vapors (refer to table) |
| Sensor element | Catalytic bead (pellistor), diffusion |
| Range | 0 - 100% LEL |
| Accuracy | ± 1% of reading |
| Repeatability | ± 2% of reading |
| Long term zero point drift | < 0.5% LEL methane/month |
| Long term sensitivity drift | < 2% LEL methane/month |
| Response time | < 10 sec. methane |
| Sensor life expectancy | 3 yrs. normal operating environ. |
| Sensor coverage | Dependent on the target gas |
| Installation Location | Dependent on the target gas |
| Mounting height | Dependent on the target gas |

* % v/v = 100% LEL

** NRTL Performance Tested & Certified
Conforms to STD
UL 2075 / UL 2017

<table>
<thead>
<tr>
<th>Combustible Gases/Vapors</th>
<th>% v/v</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone (CH₃)₂CO</td>
<td>2.6</td>
</tr>
<tr>
<td>Ammonia NH₃</td>
<td>15.0</td>
</tr>
<tr>
<td>Benzene C₆H₆</td>
<td>1.2</td>
</tr>
<tr>
<td>Ethylene C₂H₄</td>
<td>2.3</td>
</tr>
<tr>
<td>Ethyl Acetate CH₃COOC₂H₅</td>
<td>2.2</td>
</tr>
<tr>
<td>Ethyl Alcohol C₂H₅OH</td>
<td>3.3</td>
</tr>
<tr>
<td>Hydrogen H₂</td>
<td>4.0</td>
</tr>
<tr>
<td>Isopropyl Alcohol (CH₃)₂CHOH</td>
<td>2.2</td>
</tr>
<tr>
<td>Jet A</td>
<td>1.4</td>
</tr>
<tr>
<td>JP8</td>
<td>0.9</td>
</tr>
<tr>
<td>Methane CH₄</td>
<td>5.0</td>
</tr>
<tr>
<td>Methanol CH₃OH</td>
<td>6.7</td>
</tr>
<tr>
<td>Methyl Ethyl Ketone C₄H₈O</td>
<td>1.9</td>
</tr>
<tr>
<td>n-Butane C₄H₁₀</td>
<td>1.8</td>
</tr>
<tr>
<td>n-Heptane C₇H₁₆</td>
<td>1.05</td>
</tr>
<tr>
<td>n-Hexane C₆H₁₄</td>
<td>1.1</td>
</tr>
<tr>
<td>n-Octane C₈H₁₈</td>
<td>0.95</td>
</tr>
<tr>
<td>n-Pentane C₅H₁₂</td>
<td>1.4</td>
</tr>
<tr>
<td>Propane C₃H₈</td>
<td>2.1</td>
</tr>
<tr>
<td>Toluene C₆H₆</td>
<td>1.2</td>
</tr>
</tbody>
</table>

* x% v/v = 100% LEL
LEL = Lower Explosive Limit
v/v = Volume by Volume
**SPECIFICATION**

**Type of Control**

- General: Five-stage (S1 to S5) control, assignable up to five (5) binary/relay output, i.e., Low-med-high-fault/fail-horn*, or low1-low2-med1-med2-high, or any other combinations (* = horn/audible alarm built-in and factory pre-configured to relay output “R05”)

**Analog inputs**

- Three (3) 4-20 mA, for additional remote sensors

**Analog reading**

- Current and mean (average) value

**Stage level / setpoint**

- Field adjustable over full range, five (5) per analog input, assignable to current or mean (average) value

**- hysteresis/switching differential**

- Selectable for each sensor point

**Digital inputs**

- Four (4), each can be individually assigned to any relay (R1...R5). Digital inputs are used for remote audio/visual alarm reset

**Relay outputs (R1-R5) w/ status LEDs**

- Five (5) SPDT, 8A 24 VAC/VDC-250 VAC contact resistance 100 mΩ, max.

**- each stage level (S1-S5)**

- Assignable to any relay

**- sensor fail-safe**

- Assignable to any stage level

**Time delay switching**

- Selectable for make and brake of each sensor point (SP1 to SP4) 0-9,999 seconds

**Analog output**

- Two (2) independent 4-20 mA signal, 500 Ω max. load, selectable as low, high or averaging of sensor inputs

**Audible alarm**

- 85 db (10 ft), enabled or disabled, selectable; assignable to stage level S1, S2, S3, S4 or S5

**Alarm acknowledgement**

- Menu-driven and system reset function for latched relays

**User Interface**

- Keypad type: Refer to "illustration keypad user interface"

**Touch buttons**

- Six (6)

**Status LED's**

- Yellow: Fault (fail)

**Digital display**

- Liquid Crystal Display (LCD), two lines, 16 characters per line, 1 digit resolution, backlit

**- unit display**

- Menu selectable, per sensor; ppm, %v/v, %LEL, °F or % RH

**Environmental**

- Permissible ambient
  - working temperature: 23°F to 104°F (-5°C to 40°C)
  - storage temperature: 23°F to 86°F (-5°C to 30°C)
  - humidity: 15 to 95% RH, non condensing
  - working pressure: Atmospheric ± 10%

**Physical**

- Enclosure (panel)
  - material: Polycarbonate, impact resistance EN 50102/IK08, flammability rating UL 94-V

**- conformity**

  - UL Type 1, UL 508/UL 50 standards

**- color**

  - Light gray, smoked gray for cover

**- protection**

  - NEMA 4X (IP 65)

**- installation**

  - Wall (surface) mounted

**Dimensions (H x W x D)**

- base: 7.9 x 7.5 x 4.1 in. (200 x 190 x 105 mm)

**- Cable entry**

- 5 holes for 1/2 in. conduit, covered

**- Wire connection**

- Terminal blocks, Push-on connect and screw type for lead wire

**Wire size**

- input: Min. 22 AWG (0.34 mm²)
  - output: Max. 16 AWG (1.50 mm²)

**- Weight**

- 4.5 lbs. (2.0 kg)

**Approvals / Listings**

- Systems

  - NRTL Performance Tested & Certified:
    - sensor/transmitter Conforms to STD ANSI/UL 2075
    - controller Conforms to STD ANSI/UL 2017
    - transmitter & controller CE
    - enclosure (panel) UL Listed, E75645

**Warranty**

- Two years material and workmanship

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(▲) Performance tested with Methane and Propane gases

Customer Services (858) 578-7887 & (888) GO INTEC Fax (858) 578-4633 & (888) FX INTEC INTEC Controls, 12700 Stowe Dr. Suite 110, Poway, CA 92064 www.inteccontrols.com Specification subject to change without notice. Page 2 of 6 Printed in USA 100512
**ORDERING INFORMATION**

**SPC2-3300 - 0 00 US** *(Product label “SPC2-33xx-xxx US V3”)*

<table>
<thead>
<tr>
<th>Gases</th>
<th>Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>08 Ammonia</td>
<td>NH₃</td>
</tr>
<tr>
<td>19 Ethylene</td>
<td>C₂H₄</td>
</tr>
<tr>
<td>25 Ethyl Alcohol</td>
<td>C₂H₅OH</td>
</tr>
<tr>
<td>27 Ethyl Acetate</td>
<td>C₃H₇COOC₂H₅</td>
</tr>
<tr>
<td>30 Benzene</td>
<td>C₆H₆</td>
</tr>
<tr>
<td>35 n-Hexane</td>
<td>C₆H₁₄</td>
</tr>
<tr>
<td>37 n-Heptane</td>
<td>C₇H₁₆</td>
</tr>
<tr>
<td>40 Hydrogen</td>
<td>H₂</td>
</tr>
<tr>
<td>45 Isopropyl Alcohol</td>
<td>(CH₃)₂C HOH</td>
</tr>
<tr>
<td>50 Methanol</td>
<td>CH₃O H</td>
</tr>
<tr>
<td>55 Methane</td>
<td>CH₄</td>
</tr>
<tr>
<td>58 Methyl Ethyl Ketone</td>
<td>C₄H₈O</td>
</tr>
<tr>
<td>60 n-Butane</td>
<td>C₄H₁₀</td>
</tr>
<tr>
<td>70 n-Octane</td>
<td>C₅H₁₈</td>
</tr>
<tr>
<td>75 n-Pentane</td>
<td>C₅H₁₂</td>
</tr>
<tr>
<td>80 Propane</td>
<td>C₃H₈</td>
</tr>
<tr>
<td>85 Acetone</td>
<td>(CH₃)₂CO</td>
</tr>
<tr>
<td>89 Jet A</td>
<td>-</td>
</tr>
<tr>
<td>90 J P8</td>
<td>-</td>
</tr>
<tr>
<td>91 Toluene</td>
<td>C₇H₈</td>
</tr>
</tbody>
</table>

Standard control system, ordering part number:

**SPC2 - 3355 - 000 US**,  
configuration includes:

- Digital, programmable controller with menu-driven keypad user interface, LCD & LEDs, 24 VAC/VDC, 50/60 Hz
- NEMA 4X enclosure

  **Built-in:**
  - (1) Combustible gas sensor/transmitter for Methane (CH₄)
  - (1) Horn, audible alarm

  **Inputs:**
  - (3) 4-20 mA, for remote sensors
  - (4) Digital

  **Outputs:**
  - (5) Relays, SPDT, 8 A
  - (2) 4-20 mA

**Trip/Setpoints**

- **00** Factory set (built-in sensor):
  - Low alarm @ 20% LEL (“R1”),
  - High alarm @ 40% LEL (“R2”),
  - Horn alarm @ 40% LEL (“R5”)

- **01-99** Special on request

**Options**

- **0** No options
- **1** Key lock w/2 keys

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**System Operation**

All Programming is made via the keypad user interface in combination with the display screen. Security is provided via two password levels. The lower level password allows to override or to reset system status functions. The upper level password allows all programming and override functions.

**Main Page Display**

Displays date and time, unless a system error occurs, then the error is displayed.

**Main Menu**


**Sub Menu “System Errors”**

Displays errors, reset corrected errors, and historical error summary.

**Sub Menu “Stage Status”**

Displays status of each “SP” sensor point, stage level/setpoint exceeded.

**Sub Menu “Relay Status”**

Displays status and manual control of each output relay.

**Sub Menu “Sensor Readings”**

The current and mean/average values are displayed for each “SP” sensor point with sensing type and engineering unit (ppm, %v/v, %LEL, F, %RH).

**Sub Menu “Relay Setup”**

Enter and/or change parameters of each relay.
- Assign de-energized or energized normal operation
- Select steady or flashing function
- Select horn function
- Select latching or non-latching mode
- Select digital input usage, and assign to any output relay

**Sub Menu “SP Setup”**

Enter and/or change parameters of each sensor point.
- Activate sensor point
- Select sensor point type (gas, temperature, humidity)
- Select measuring range
- Select sensor signal
- Select stage/setpoint 1 to 5
- Select hysteresis
- Set delay ON/OFF time
- Select current or mean/average value
- Assign sensor point fault to stage level setpoint
- Assign setpoint 1 to 5 to any output relay
- Assign to analog Output

**Sub Menu “System Setup”**

Enter and/or change system parameters.
- Select service mode
- Set next maintenance date
- Select service phone number
- Select averaging function, time and overlay, of any SP
- Set date, time and time format
- Change customer password
- Select analog output function
- Set failure relay
- Select power ON time
- Select appropriate hardware configuration
FIELD WIRING CONFIGURATION

Recommended
• **Twisted, shielded wire for analog inputs**
  (Shield to be terminated and connected only at the sensor/transmitter location)
• **Grounded housing**

Caution:
The non-metallic enclosure does not provide grounding between conduit connections. Use grounding bushings and jumper wires.

The enclosure is to be mounted using the mounting holes located in the base external to the equipment cavity, or the equivalent.

The conduit hubs must be connected to the conduit before connected to the enclosure.

When connecting conduit to the enclosure use only UL listed or UL recognized conduit hubs that have the same environmental type rating as the SPC2 enclosure.

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**24 VAC/VDC Input Power Supply**

- 24 VAC/VDC, -15%/+20%, 50/60 Hz
- "Min wire size 16 AWG (1.5 mm²)"

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FIELD WIRING CONFIGURATION (cont...)

Binary - Relay Outputs “R01 to R05”

Built-in horn alarming***
factory wired, 24 VDC
Fault (fail) alarming
Stage-level control & alarming

*** Factory pre-configured horn and fault (fail-safe), can be reassigned/converted for remote control, stage-level #4 and/or #5

△ = Relay status LEDs D1 to D5 located below terminal connection of sensor inputs (X10)

Digital Inputs “DI01 to DI04”

Analog Outputs “AO01 and AO02”

Remote Sensor Inputs “SP02 to SP04”

4-20 mA signal
to remote control or BAS,
selectable low, high or
averaging of (4) analog (sensor)
inputs, 500 Ω max. load

The current signal is sourced
by the SPC2 system

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