Ammonia (NH₃) Single-Point Gas Detection System

DESCRIPTION
Wall-mounted gas monitor with built-in ammonia (NH₃) sensor, accepts one analog remote device such as a secondary gas sensor, temperature or humidity sensor.

APPLICATION
To detect and control levels of ammonia (NH₃) and other gases in a wide variety of commercial and industrial applications such as the ammonia level in chiller equipment rooms, food storages, freezers, arenas, breweries, and ventilation systems, etc. The controller can communicate with any compatible electronic analog control, DDC/PLC control or automation system via binary and/or analog output signal.

FEATURES
- Continuous monitoring
- One (1) built-in NH₃ electrochemical sensor
- Easy plug-in sensor
- One (1) remote analog input, 4-20 mA
- One (1) digital input
- Two (2) relay outputs:
  - Four stage control
  - Fail-safe assignable
- One (1) analog output, (0)4-20 mA / (0)2-10 VDC
  - Selectable for low, high, or averaging
- One (1) 24 VDC switched output, 50 mA max.
- Liquid Crystal Display (LCD)
- LED status indicators
- Accepts toxic or combustible gas, refrigerant, temperature or humidity secondary remote sensor input
- Built-in horn
- Keypad user interface
- Simple menu-driven programming
- Modular technology
- Overload & short-circuit protected
- NEMA 4X enclosure
- Easy maintenance

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Electric</th>
<th>Type of Control</th>
</tr>
</thead>
</table>
| Power supply | 24 VAC/VDC, -20%/+15%
50/60 Hz, reverse polarity protected |
| Power consumption | 5 VA (0.2 A) w/ (1) remote sensor connected |
| Sensor Performance | Analog input  |
| Gas detected | Ammonia (NH₃) |
| Sensor element | Electrochemical, diffusion |
| Range | 0-300 ppm or 0-1000 ppm, fixed |
| Resolution | 4.0 ppm |
| Repeatability | ± 3.0 % of reading |
| Long term output drift | < 5% / 6 months |
| Response time | t<sub>90</sub> < 35 sec. |
| Sensor life expectancy | 2 years, normal operating environment |
| Sensor coverage | 2,000 sq. ft., max 3,000 sq. ft. (180 m², max 280 m²), under “ideal conditions” |
| Installation Location | Mounting height | 1 ft. (0.3 m) below ceiling |
| | Analog reading  |
| | Field adjustable over full range, four (4) stages (S1 to S4) per analog input, assignable to current or mean (average) value |
| | Stage level / setpoint |
| | Selectable for each sensor point |
| | One (1); can be assigned to any relay (R1, R2) |
| | - hysteresis/switching differential |
| | - application |
| | Remote audio/visual alarm reset or override function |

PolyGard
SPC3-1120

NRTL Certification to STD UL 61010-1
## SPECIFICATION

### Type of Control (cont...)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay outputs (R1, R2) w/ status LEDs</td>
<td>(1) SPDT (R1), and (1) SPST-NC or SPST-NO (R2), jumper selectable</td>
</tr>
<tr>
<td>Contact rating</td>
<td>30 VAC/VDC, 0.5 A, max.</td>
</tr>
<tr>
<td>- each stage level (S1-S4)</td>
<td>Assignable to any relay</td>
</tr>
<tr>
<td>- sensor fail-safe</td>
<td>Assignable to any stage level</td>
</tr>
<tr>
<td>Time delay switching</td>
<td>Selectable for make and brake of each sensor point (SP1 to SP2) 0-9,999 seconds</td>
</tr>
<tr>
<td>Analog output</td>
<td>One (1), (0)4-20 mA, load &lt; 500 Ω; (0)2-10 VDC, load &gt; 50K Ω; jumper selectable; polarity protected, assignable to low, high or averaging of sensor inputs</td>
</tr>
<tr>
<td>VDC switched output</td>
<td>One (1) 24 VDC, 50 mA max</td>
</tr>
<tr>
<td>Audible alarm</td>
<td>83 db @ unit, enabled or disabled, selectable; assignable to stage level S1, S2, S3 or S4</td>
</tr>
<tr>
<td>Alarm acknowledgment</td>
<td>Menu-driven and system reset function for latched relays</td>
</tr>
</tbody>
</table>

### User Interface

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keypad type</td>
<td>Refer to illustration “Keypad User Interface”</td>
</tr>
<tr>
<td>Touch buttons</td>
<td>Four (4)</td>
</tr>
<tr>
<td>Status LED’s</td>
<td>Four (4), for system on, stage status, and failure</td>
</tr>
<tr>
<td>Digital display</td>
<td>Liquid Crystal Display (LCD), two lines, 16 characters per line, 1 digit resolution</td>
</tr>
<tr>
<td>- unit display</td>
<td>Menu selectable, per sensor; ppm, %v/v, %LEL, °F or %RH</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible ambient</td>
<td>14°F to 122°F (-10°C to 50°C)</td>
</tr>
<tr>
<td>- storage temperature</td>
<td>23°F to 86°F (-5°C to 30°C)</td>
</tr>
<tr>
<td>- humidity</td>
<td>15 to 95% RH, non-condensing</td>
</tr>
<tr>
<td>- working pressure</td>
<td>Atmospheric ± 10%</td>
</tr>
</tbody>
</table>

### Physical

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure (panel)</td>
<td>Polycarbonate, UL 94-HB, fire-retardant</td>
</tr>
<tr>
<td>- material</td>
<td>UL 50 standards</td>
</tr>
<tr>
<td>- color</td>
<td>Light gray</td>
</tr>
<tr>
<td>- protection</td>
<td>NEMA 4X (IP65)</td>
</tr>
<tr>
<td>- installation</td>
<td>Wall (surface) mounted, or single gang electrical box</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>5.12 x 5.12 x 2.95 in. (130 x 130 x 75 mm)</td>
</tr>
<tr>
<td>Cable entry</td>
<td>3 holes for 1/2 in. conduit for wall (surface) mounting and 1 hole on back side of base plate for single gang electrical box mounting</td>
</tr>
</tbody>
</table>

### Wire connection

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal blocks, screw type for lead wire</td>
<td></td>
</tr>
<tr>
<td>Wire size</td>
<td>Min. 24 AWG (0.25 mm²) Max 14 AWG (2.5 mm²)</td>
</tr>
<tr>
<td>Wire distance</td>
<td>Max. loop resistance 450 Ω (= wire distance plus controller input resistance)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.6 lb (0.3 kg)</td>
</tr>
</tbody>
</table>

### Approvals / Listings

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>- unit rating</td>
<td>NRTL Certification to STD</td>
</tr>
<tr>
<td>EMC-Compliance</td>
<td>CE LVD 73/23/EWG</td>
</tr>
<tr>
<td>- relays (R1-R2)</td>
<td>UL Recognized, E41515</td>
</tr>
<tr>
<td>- enclosure</td>
<td>CSA, C22.2 No. 0, No. 14 (File No. LR31928)</td>
</tr>
<tr>
<td>Warranty</td>
<td>Two years material and workmanship, 12 months normal exposure for sensor element</td>
</tr>
</tbody>
</table>

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ORDERING INFORMATION

SPC3-1120 - 200 US

Enclosures

| 2 | Wall NEMA 4X |

2 = Standard enclosure

Range & Trip/Setpoints

00
- Range: 0-300 ppm NH₃
- Factory set (for built-in sensor):
  - Stage (S1 to S4)
    - S1 = Low alarm @ 35 ppm NH₃ (Relay R1)
    - S2 = High alarm @ 75 ppm NH₃ (Relay R2)
    - S3 = Audible alarm @ 75 ppm NH₃ (built-in horn)
    - S4 = Remote alarm @ 75 ppm NH₃ (24 VDC switched output)

01
- Range: 0-1000 ppm NH₃
- Factory set (for built-in sensor):
  - Stage (S1 to S4)
    - S1 = Low alarm @ 250 ppm NH₃ (Relay R1)
    - S2 = High alarm @ 500 ppm NH₃ (Relay R2)
    - S3 = Audible alarm @ 500 ppm NH₃ (built-in horn)
    - S4 = Remote alarm @ 500 ppm NH₃ (24 VDC switched output)

02
- Special request

00 = Standard range & trip points
(Trip/setpoints can be changed at time of commissioning)

Standard control system, ordering part number:

SPC3 - 1120 - 200 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) NH₃ sensor/transmitter, range 0-300 ppm NH₃
- (1) Horn, audible alarm

Input:
- (1) 4-20 mA, for remote sensor

Outputs:
- (2) Relays, 30 VAC/VDC, 0.5 A max.;
  - 1-SPDT (R1) and
  - 1-SPST-NO/NC (R2), jumper selectable
- (1) Switched 24 VDC, 50 mA max.
- (1) (0)4-20 mA or (0)2-10 VDC, selectable
USER INTERFACE & CONTROLLER

Keypad User Interface

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 (1234) allows to override or to reset system status functions. The upper level password (9001) allows all programming and override functions.

Main Page Display
After powered on, displays INTEC and part number and changes to sensor reading display 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
- Set delay ON/OFF time

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 4
- 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 4 to any output relay
- Assign to analog output

Sub Menu “System Setup”
Enter and/or change system parameters.
- Select service mode
- Display software version
- Set maintenance after days
- Select service phone number
- Select averaging function, time and overlay, of any SP
- Set maintenance period days
- Change customer password
- Set failure relay
- Select power ON time
- Select analog output function
**WIRING CONFIGURATION**

24 VAC/VDC Input Power Supply, and Analog Output “AO01”

```
+---+---+---+---
| X4 | 7 | 6 | 5 |
| (+) | 4 | 3 | 2 |
| (-) | 1 |

(+) Over both pins = VDC
(-) Pins not covered = mA
```

(0) 4-20 mA, or
(0) 2-10 VDC***

24 VAC/VDC**
-20%/15%, 50/60 Hz

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Optional 4-20 Remote AT...V3 Series Sensor/Transmitter
Input “SP02”

4-20 mA, 3-wire sensor/transmitter

```
+---+---+---+---
| X4 | 7 | 6 | 5 |
| (+) | 4 | 3 | 2 |
| (-) | 1 |

4-20 mA, 3-wire sensor/transmitter
```

4-20 mA, 2-wire loop-powered sensor/transmitter

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**Jumper output signal “AO01” range selectors:

V-A Over both pins = VDC
Pins not covered = mA

0-20% Over both pins = 4-20 mA / 2-10 VDC
Pins not covered = 0-20 mA / 0-10 VDC

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**Binary-Relay Outputs “R01 and R02”,
24 VDC switched Output “S4”,
and Digital Input**

```
+---+---+---+---
| X5 | 1 | 2 | 3 |
| (+) | 4 | 5 |

24 VDC, 50 mA
```

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Relays are normally de-energized,
30 VAC/VDC
0.5 A

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S3 = Built-in horn
S4 = Switched output

**Jumper SPST relay (R2) NC/NO selector:

NC Covers top two pins = SPST-NC
NO Covers bottom two pins = SPST-NO

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**/*** Attention:

- Only the same type of power, VAC or VDC, as supplied to the unit, is available for the remote transmitter.
  i.e. When 24 VDC transmitter power is required, the unit must be powered with 24 VDC.
- 2-wire loop powered transmitter can use the internal power.
- 3-wire transmitters that allow power common to DC common can use the same power supply to power the SPC3 and the transmitter.
- 3-wire transmitters that require separate power common from DC common must use a separate power source.

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Twisted, shielded wire is recommended for 2- or 3- wire configurations.