

# Nitrogen Dioxide (NO<sub>2</sub>) Gas Detection and Control System



**PolyGard  
SPC2-1130**

## DESCRIPTION

Gas monitor with built-in nitrogen dioxide (NO<sub>2</sub>)/diesel fume 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 nitrogen dioxide (NO<sub>2</sub>) gas and other gases in a wide variety of commercial and industrial applications such as vehicle diesel exhaust in parking structures, engine repair shops, tunnels, equipment rooms and ventilation systems, 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.



NRTL Certification to STD  
**UL 61010-1**  
"Pending"

## FEATURES

- *Continuous monitoring*
- *One (1) built-in NO<sub>2</sub> electrochemical sensor, gas specific, 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

<b>Electric</b>		<b>Installation Location</b>	
Power supply	24 VAC/VDC, -15%/+20%, 50/60 Hz, auto-resettable fuse	Mounting height	1 to 3 ft (0.3 to 1.0 m) above floor for standard garage applications, consult with factory for other applications
Power consumption	13 VA (0.5 A), w/max sensor connections		
RF/EMI protected	4.0 W @ 3 ft. (1 m) radiated	<b>Type of Control</b>	
<b>Sensor Performance</b>		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")
Gas detected	Nitrogen dioxide (NO <sub>2</sub> )	Analog inputs	Three (3) 4-20 mA, for additional remote sensors
Sensor element	Electrochemical, diffusion	Analog reading	Current and mean (average) value
Range	Span field selectable from 0-10 to 0-20 ppm via calibration, 0-10 ppm factory set	Stage level / setpoint	Field adjustable over full range, five (5) per analog input, assignable to current or mean (average) value
Stability & resolution	± 0.1 ppm of reading		
Repeatability	± 2% of reading		
Long term output drift	< 2% signal loss/month		
Response time	t <sub>90</sub> < 60 sec.		
Sensor life expectancy	2 years, normal operating environment		
Sensor coverage	4,000 sq.ft., max. 6,000 sq.ft. (372 m <sup>2</sup> , max. 558 m <sup>2</sup> ), under "ideal conditions"		
		- hysteresis/ switching differential	Selectable for each sensor point

**SPECIFICATION**

**Type of Control (Cont...)**

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 90 db, 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)  
 Red: Alarm

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 122°F (-5°C to 50°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 94-5V UL Type 1, UL 508/UL 50 standards  
 - conformity  
 - 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

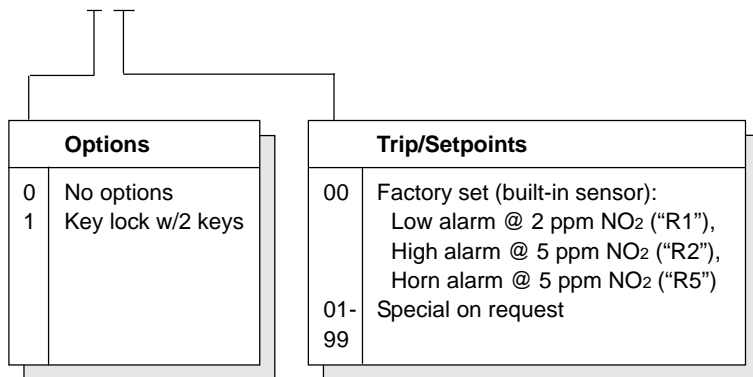
Wire size  
 - input Min. 22 AWG (0.34 mm<sup>2</sup>)  
 Max. 16 AWG (1.50 mm<sup>2</sup>)  
 - output Min. 24 AWG (0.25 mm<sup>2</sup>)  
 Max. 14 AWG (2.50 mm<sup>2</sup>)  
 Weight 4.5 lbs. (2.0 kg)

**Approvals / Listings**

- unit rating NRTL Certification to STD ANSI/UL 61010-1 – "Pending" CE  
 EMV-Compliance 89/336/EWG  
 UL Recognized, E5610 & E108658  
 CSA, C22.2 No. 14, LR35579  
 VDE  
 - enclosure (panel) UL Listed, E75645  
**Warranty** Two years material and workmanship

**ORDERING INFORMATION**

**SPC2-1130 - 0 00 US** (Product label "SPC2-1130-xxx US V3")



Standard control system, ordering part number:

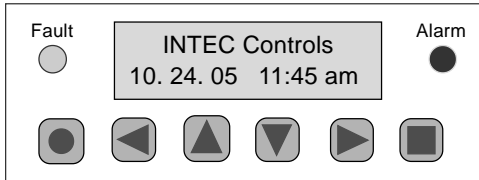
**SPC2 - 1130 - 000 US**, configuration includes:

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

- Built-in: (1) NO<sub>2</sub> sensor/transmitter  
 (1) Horn, audible alarm
- Inputs: (3) 4-20 mA, for remote sensors  
 (4) Digital
- Outputs: (5) Relays, SPDT, 8 A  
 (2) 4-20 mA

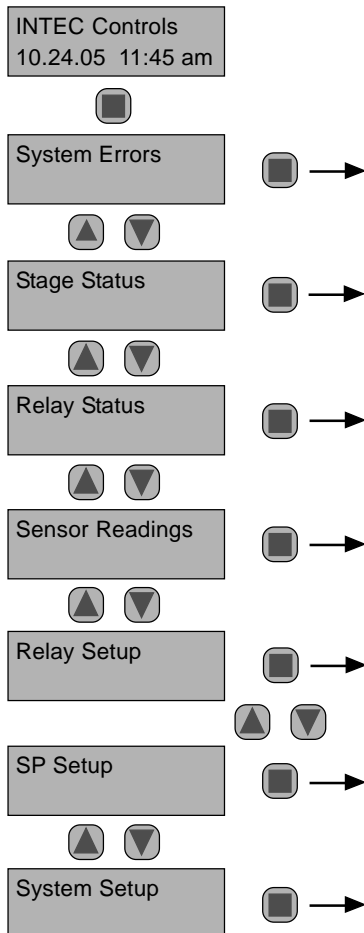
**USER INTERFACE & CONTROLLER**

**Keypad User Interface**



- Fault  
"Yellow LED" Flashes at system / sensor failed
- Alarm  
"Red LED" Flashes when any stage level setpoint is exceeded; steady when any relay output is in manual override operation
- Scroll down & up in Main menu and Sub menus; increases or decreases a value
- Navigates through menus on the same level; moves cursor when inputting data
- Exits programming and saves settings or return to previous level or menu
- Enter Sub menus or stores data; horn silence (if assigned)

**Main Page & Main Menu**



**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**

Displays headings of "System Errors", "Stage Status", "Relay Status", "Sensor Readings", "Relay Setup", "SP (Sensor Point) Setup", and "System Setup".

**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.

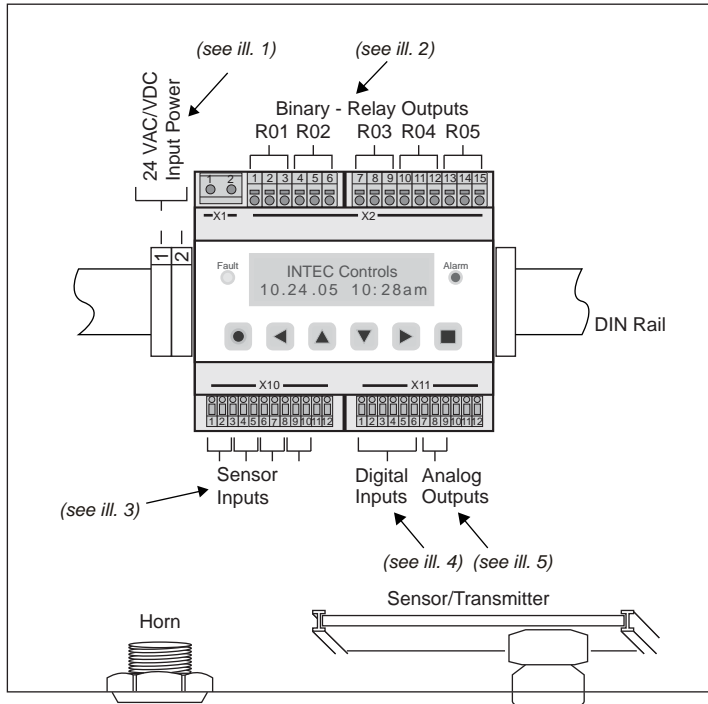
- Activate sensor point
- Select sensor point type (gas, temperature, humidity)
- Select measuring range
- Select sensor signal
- Select stage/setpoint 1 to 5
- Select hysteresis
- Set delay ON/OFF time
- Select current or mean/average value
- Assign sensor point fault to stage level setpoint
- Assign 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**

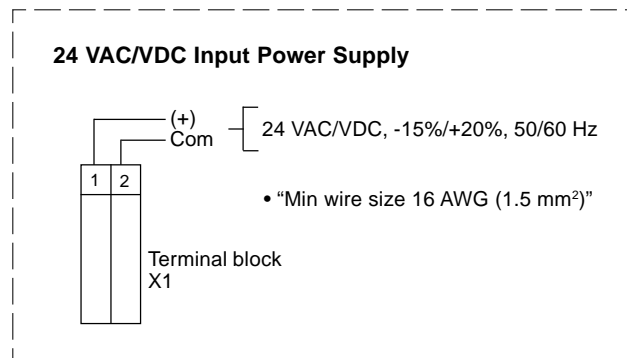
**Caution:**

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.

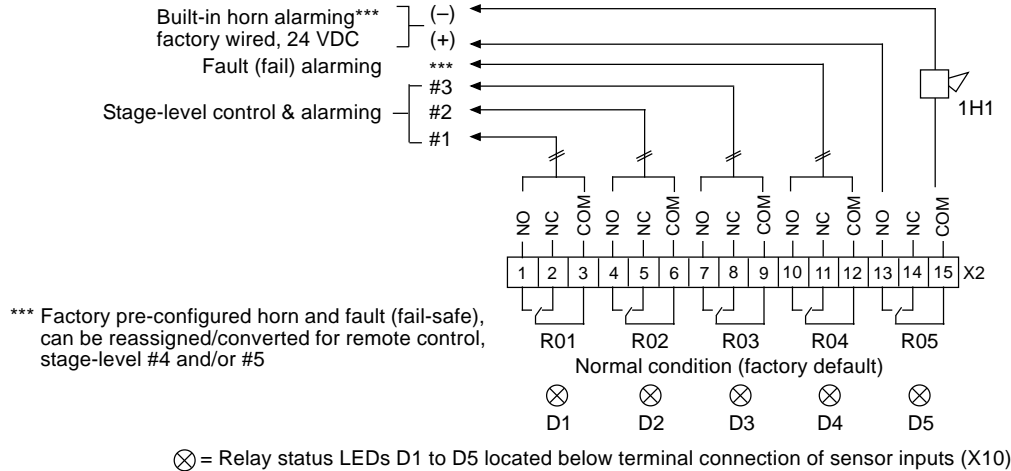
When connecting conduit to the enclosure use only UL listed or UL recognized conduit hubs that have the same environmental type rating as the SPC2 enclosure.



ill. 1

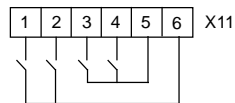
**FIELD WIRING CONFIGURATION (cont...)**

**Binary - Relay Outputs "R01 to R05"**



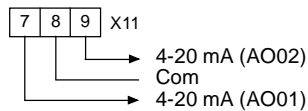
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**Digital Inputs "DI01 to DI04"**



ill. 4

**Analog Outputs "AO01 and AO02"**

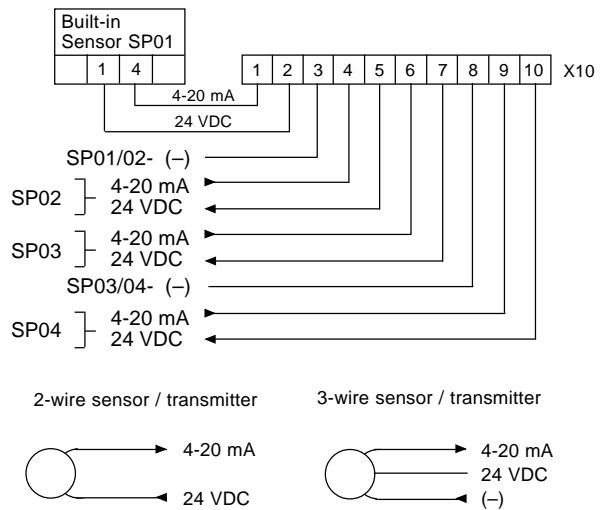


4-20 mA signal to remote control or BAS, selectable low, high or averaging of (4) analog (sensor) inputs, 500 Ω max. load

The current signal is sourced by the SPC2 system

ill. 5

**Remote Sensor Inputs "SP02 to SP04"**



ill. 3