Carbon Monoxide (CO) Gas Detection and Control System

DESCRIPTION
Carbon monoxide (CO) detection and control system, wall-mounted, with one, two, three or four remote sensors/transmitters.

APPLICATION
To detect and control levels of carbon monoxide (CO) in a wide variety of commercial and industrial applications such as vehicle exhaust in parking structures, engine repair shops, 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.

FEATURES
- Continuous monitoring
- CO electrochemical sensor, gas specific
- Polarity protected
- Up to (4) sensor inputs
- Four (4) digital inputs
- Five (5) relay outputs:
  - Five-stage control
  - Fail-safe assignable
- Up to (4) sensor inputs
- Two (2) analog outputs, 4-20 mA
  - Selectable for low, high or averaging
- Optional BACnet coupler upwards communication to BAS
- Liquid Crystal Display (LCD)
- LED status indicators
- Built-in horn
- Keypad user interface
- Simple menu-driven programming
- RFI/EMI protected
- Modular plug-in technology
- Overload & short-circuit protected
- NEMA 4X, transmitter enclosure
- NEMA 4X, controller enclosure
- Easy maintenance

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Carbon Monoxide (CO) Detection and Control System Package</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller Digital programmable menu-driven keypad user interface LCD &amp; LEDs, 24 VDC, NEMA 4X enclosure</td>
<td>LGC-CO-01</td>
</tr>
<tr>
<td>Inputs: (4) 4-20 mA</td>
<td>Sensor range: 0-250 ppm CO, 4-20 mA, 2-wire, loop powered 24 VDC, NEMA 4X wall mount enclosure</td>
</tr>
<tr>
<td>Outputs: (5) Relays, SPDT, 8 A</td>
<td>Incl. (1) CO remote sensor</td>
</tr>
<tr>
<td>(2) 4-20 mA</td>
<td>Incl. (2) CO remote sensors</td>
</tr>
<tr>
<td>Built-in (1) Horn</td>
<td>Incl. (3) CO remote sensors</td>
</tr>
<tr>
<td>BACnet upwards communication coupler &quot;T5-BAC-1-A&quot; (external)</td>
<td>Incl. (4) CO remote sensors</td>
</tr>
<tr>
<td></td>
<td>T5-BAC-1-A</td>
</tr>
</tbody>
</table>

Factory configured CO alarm levels/setpoints:
- Low alarm @ 25 ppm (relay #01)
- High alarm @ 100 ppm (relay #02)
- Horn alarm @ 100 ppm (relay #05)

Other setpoints/programming are available on special request. All devices are field programmable and adjustable.
## SPECIFICATIONS

### Electric
- **Power supply**
  - **controller**: 24 VDC, -15%/-+20%, 50/60 Hz, auto-resettable fuse
  - **sensor(s)/transmitter(s)**: 24 VDC from controller, loop powered, polarity protected
- **Power consumption**: 13 VA (0.5 A), w/max sensor connections
- **RF/EMI protected**: 4.0 W @ 3 ft. (1 m) radiated

### Sensor Performance
- **Gas detected**: Carbon monoxide (CO)
- **Sensor element**: Electrochemical, diffusion
- **Range**: Span field adjustable from 0-200 to 0-300 ppm via calibration, 0-250 ppm factory set
- **Resolution**: ± 3.0 ppm of reading
- **Repeatability**: ± 3.0% of reading
- **Long term output drift**: < 0.4% signal loss/month
- **Response time**: t<sub>90</sub> < 50 sec.
- **Sensor element life expectancy**: 3-5 years, normal operating environment
- **Sensor coverage**: 5,000 sq.ft., max. 10,000 sq.ft. (465 m², max. 930 m²), under “ideal conditions”

### Installation Location
- **Sensor mounting height**: 5 to 6 ft. (1.5 to 1.8 m) above floor

### 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**: Four (4) 4-20 mA, for 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).
- **- application**: Remote audio/visual alarm reset or override function
- **Relay outputs (R1-R5) w/ status LEDs**: Five (5) SPDT, 8 A 24 VAC/VDC-250 VAC contact resistance 100 mΩ, max.

### User Interface
- **Keypad type**: Refer to section “User Interface & Controller”
- **Touch buttons**: Six (6)
- **Status LED’s**: 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, %LEL, Vol%, °F, %RH, %, ppk, °C

### BACnet Interface, optional*
- **Coupler module**: C5-BAC-98 (B)
- **Communication**: TCP/IP 10/100 Mbits/sec
- **Connector**: Ethernet RJ45
- **Interface**: BACnet-Profile
- **Description**: "Who-is (execute)" "I-am (initiate)"
- **ReadProperty” “WriteProperty”

### Environmental
- **Permissible ambient controller**
- **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
- **Permissible ambient sensor/transmitter**
- **working temperature**: 14°F to 122°F (-10°C to 50°C)
- **intermitted temperature**: -4°F to 122°F (-20°C to 50°C)
- **storage temperature**: 41°F to 86°F (5°C to 30°C)
- **humidity, continuous**: 15 to 90% RH, non-condensing
- **humidity, intermitted**: 0 to 99% RH, non-condensing
- **working pressure**: Atmospheric ± 10%

(*) BACnet Interface: NRTL Certification to UL STD 61010-1 – “Pending”
## SPECIFICATIONS

### Physical, Controller Enclosure (panel)
- **Material**: Polycarbonate, impact resistance EN 50102/IK08, flammability rating UL 94-SV
- **Conformity**: UL Type 1, UL 508/UL 50 standards
- **Color**: Light gray, smoked gray for cover
- **Protection**: NEMA 4X (IP65)
- **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), Max. 16 AWG (1.50 mm²)
- **Output**: Min. 24 AWG (0.25 mm²), Max. 14 AWG (2.50 mm²)

### Weight
- 4.5 lbs (2.0 kg)

### Enclosure (panel) approval
- UL Listed, E75645

### Physical, Sensor/Transmitter Enclosure, standard
- **Material**: Polycarbonate, UL 94-HB, fire-retardant
- **Conformity**: UL 50
- **Color**: Light gray
- **Protection**: NEMA 4X (IP65)
- **Installation**: Wall (surface) mounted, or single gang electrical box

### Dimensions (H x W x D)
- **Base**: 5.12 x 3.31 x 2.95 in. (130 x 84 x 75 mm)

### Cable entry
- 1 hole for 1/2 in. conduit for wall (surface) mounting and 1 hole on back side of base plate for single gang electrical box mounting

### Wire connection
- Terminal blocks, screw type for lead wire

### Wire size
- **Input**: Min. 24 AWG (0.25 mm²), Max. 14 AWG (2.5 mm²)

### Wire distance
- Max. loop resistance 500 Ω (= wire resistance plus controller input resistance)

### Weight
- 0.6 lbs (0.25 kg)

### Enclosure approval
- UL Listed, E208470
- CSA Certified, E208470

---

## Approvals / Listings

- **System**
  - Sensor/transmitter: Conforms to ANSI/STD UL 2075
  - Controller: Conforms to ANSI/STD UL 2017
  - Transmitter & controller: City of Los Angeles CE
  - VDI 2053, air treatment systems for garages and tunnels
  - EMC-Compliance 89/336/EWG, LVD 73/23/EWG

- **Warranty**
  - Two years material and workmanship, 12 months normal exposure for sensor element
**USER INTERFACE & CONTROLLER**

**Keypad User Interface**

- **Alarm 1**
  - Power
  - Fault
- **Alarm 2 - n**
- **INTEC 13.06.13 11:45am**

**Main Page & Main Menu**

- **INTEC 13.06.13 11:45am**
- **System Errors**
- **Stage Status**
- **Relay Status**
- **Sensor Readings**
- **Relay Setup**
- **SP Setup**
- **Data Logger**
- **System Setup**

**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 Date/Time 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 or average values are displayed for each “SP” sensor point with sensing type and engineering unit (ppm, %LEL, Vol%, °F, %RH, %, ppk, °C).

**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 latching or non-latching mode
- Select horn re-annunciation interval
- Select digital input usage, and assign to any output relay
- Set ON/OFF time delay

**Sub Menu “SP Setup”**

Enter and/or change parameters of each sensor point.
- Activate/deactivate sensor point
- Lock/unlock sensor point
- Alarm on rising or falling value
- Select sensor point type (gas, temperature, humidity)
- Select full scale measuring range
- Select sensor signal
- Select stage/setpoint 1 to 5
- Select hysteresis
- Set delay ON/OFF time
- Select current or average mode
- Assign sensor point fault to stage level activation
- Assign setpoint 1 to 5 to any output relay
- Assign to analog output

**Sub Menu “Data Logger”**

- Set data logger ON/OFF
- Set sensor data logging ON/OFF
- Set sensor data logging interval
- Set alarm (“stage status”) logging ON/OFF
- Set system error logging ON/OFF

**Sub Menu “System Setup”**

Enter and/or change system parameters.
- Select service mode ON/OFF
- 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 (alarm suppression)
- Select appropriate hardware configuration
- Assign relay multiplication
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 LGC-CO enclosure.

24 VDC Input Power Supply

![Diagram of 24 VDC Input Power Supply]

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

C5 BACnet Communication Coupler, optional

![Diagram of C5 BACnet Communication Coupler]

- Upwards BACnet communication to BAS
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) ill. 2

Digital Inputs “DI01 to DI04”

Analog Outputs “AO01 to 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 LGC2 system

Note: Twisted, shielded wire is recommended
for 2-wire configurations.
Shield should be grounded only at the
controller, DO NOT ground shield at
both ends!

Note: Sensor inputs other than AT Series
Transmitters with a power consumption
of greater than 55 mA requires a
separate DC power supply.

Remote CO sensor/transmitter “SP”

Note: Twisted, shielded wire is recommended for 2-wire configurations.
Shield should be grounded only at the controller, DO NOT ground shield at both ends!

Note: Sensor inputs other than AT Series
Transmitters with a power consumption
of greater than 55 mA requires a
separate DC power supply.