Multi-Point Digital Gas Detection and Control System

DESCRIPTION
Wall mounted, microprocessor-based, multi-point, RS-485 digital communicating system for various gas, temperature and humidity detection, control and alarm.

Optional data logging function provides internal recording of time/date stamped sensor values, alarms, and system errors. This data is highly valuable during system commissioning and with periodic analysis, ensures long-term system performance.

APPLICATION
To control and alarm upon the presence of any toxic, combustible and refrigerant gases. A combination of the RS-485 communicating DT5 series and analog AT series, or other 4-20 mA transmitters piggy-backed via a digital DT5 transmitter, can be connected to the control unit. The controller interfaces via binary outputs, 4-20 mA signals, and an optional BACnet, LON or Modbus coupler with any compatible electronic control, DDC/PLC control or automation system.

FEATURES
• Continuous monitoring
• RS-485 digital bus, serial communication
• Up to (98) remote RS-485 digital communicating transmitter inputs; or combination of (48) RS-485 digital & (48) 4-20 mA analog transmitters
• Four (4) digital inputs
• Up to (5) built-in or remote RS-485 relay/AO modules:
  - Up to (30) relay outputs, five-stage control, fail-safe assignable
  - Up to (12) 4-20 mA outputs, selectable for low, high or averaging
• One (1) 24 VDC supply output
• Built-in horn
• Accepts combination of toxic or combustible gases, refrigerants, temperature or humidity sensor inputs
• Optional BACnet, LON or Modbus coupler upwards communication to BAS
• Liquid Crystal Display (LCD)
• LED status indicators
• Keypad user interface
• Simple menu-driven programming
• Modular technology
• Overload & short-circuit protected
• Resettable breaker
• NEMA 4X enclosure
• Easy maintenance
• Optional data, alarm, and fault logging

SPECIFICATIONS
| Electric       | 120 VAC (90...230 VAC), 50/60 Hz resettable breaker, 24 VAC on request |
|               | Power consumption 70 VA, max. |
|               | RF/EMI protected 4.0 W @ 3 ft. (1 m) radiated |
| Type of Control |Five-stage (S1 to S5) control, assignable up to thirty (30) binary/relay outputs, i.e. Low-med-high-fault/fail-horn*, or low1-low2-med1-med2-high, |
| General       | Digital inputs/outputs, serial communications - standard - optional, add-ons |
|               | (1) RS-485 parallel port Up to (8) RS-485 parallel ports, proprietary protocol, single 4-conductor multi-drop configuration link Current limitation and over voltage |

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<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Control (cont...)</strong></td>
</tr>
<tr>
<td>- device configuration</td>
</tr>
<tr>
<td>Stage level / setpoint</td>
</tr>
<tr>
<td>- hysteresis/switching differential</td>
</tr>
<tr>
<td>Digital inputs</td>
</tr>
<tr>
<td>- application</td>
</tr>
<tr>
<td>Relay outputs w/status LEDs</td>
</tr>
<tr>
<td>VDC output supply</td>
</tr>
<tr>
<td>Analog output</td>
</tr>
<tr>
<td>Audible alarm</td>
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<tr>
<td>Alarm acknowledgment</td>
</tr>
<tr>
<td><strong>User Interface</strong></td>
</tr>
<tr>
<td>Keypad type</td>
</tr>
<tr>
<td>Touch buttons</td>
</tr>
<tr>
<td>Status LED's</td>
</tr>
<tr>
<td>Digital display</td>
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<tr>
<td>- unit display</td>
</tr>
<tr>
<td><strong>BACnet Interface, optional</strong></td>
</tr>
<tr>
<td>Coupler module</td>
</tr>
<tr>
<td>Communication</td>
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<tr>
<td>Sensor values</td>
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<td>Connector</td>
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<tr>
<td>Interface</td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Object types</td>
</tr>
<tr>
<td><strong>LON Interface, optional</strong></td>
</tr>
<tr>
<td>Coupler module(s)</td>
</tr>
<tr>
<td>LONWORKS®</td>
</tr>
<tr>
<td>Communication</td>
</tr>
<tr>
<td>- device category</td>
</tr>
<tr>
<td>- communication</td>
</tr>
<tr>
<td>- LONWORKS® version</td>
</tr>
<tr>
<td>- LONWORKS® object</td>
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<td></td>
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<tr>
<td><strong>Modbus Interface, optional</strong></td>
</tr>
<tr>
<td>Coupler module</td>
</tr>
<tr>
<td>Communication</td>
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<tr>
<td>Addresses</td>
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(*) BACnet, LON and Modbus Interface: NRTL Certification to UL STD 61010-1 – “Pending”
## DGC5

### Specifications

<table>
<thead>
<tr>
<th>Data Logging, optional</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation</td>
<td>Alarms, faults, values or any combination</td>
</tr>
<tr>
<td>Log rate</td>
<td>10 sec...2.7 hours</td>
</tr>
<tr>
<td>Capacity</td>
<td>4 GB, removable flash drive; approx. 18 months for all channels at 1 min. intervals</td>
</tr>
</tbody>
</table>

### Environmental

- **Permissible ambient**
  - working temperature: 23°F to 104°F (-5°C to 40°C)
  - storage temperature: -4°F to 104°F (-20°C to 40°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, UL508/UL 50 standards
  - color: Light gray, smoked gray for cover
  - protection: NEMA 4X (IP65)
  - installation: Wall (surface) mounted
  - Cable entry: 10 holes for 1/2 in. conduit, covered
  - Wire connection: Terminal blocks, Push-on connect and screw type for lead wire

- **Wire size**
  - power supply input: Min. 16 AWG (1.5 mm²) Max. 14 AWG (2.5 mm²)
  - inputs/outputs: Min. 20 AWG (0.5 mm²) Max. 16 AWG (1.5 mm²)

- **Enclosure type “A”**
  - dimensions (H x W x D): 11.0 x 12.0 x 5.7 in. (280 x 306 x 145 mm)
  - weight: 7.7 lbs. (3.5 kg)

- **Enclosure type “B”**
  - dimensions (H x W x D): 16.9 x 12.0 x 5.7 in. (430 x 306 x 145 mm)
  - weight: 10.4 lbs. (4.7 kg)

- **Enclosure type “C”**
  - dimensions (H x W x D): 22.8 x 12.0 x 5.7 in. (580 x 306 x 145 mm)
  - weight: 13.9 lbs. (6.2 kg)

### Approvals / Listings

- **- unit rating**
  - NRTL Performance Tested & Certified
  - Conforms to STD ANSI/UL 2017
  - City of Los Angeles
  - CE
  - VDI 2053, C-No. 418791
  - EMV-Compliance 89/336/EWG

- **- enclosure (panel)**
  - UL Listed, E75645

### Warranty

- Two years material and workmanship
### ORDERING INFORMATION

#### DGC5 - A 0 2 - 1 0 0 0 US

<table>
<thead>
<tr>
<th>C5 Upwards Communication Gateways</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 None</td>
</tr>
<tr>
<td>B1 BACnet; for 98 DT5 Transmitters; 0–250 ppm CO (C5-BAC-98)</td>
</tr>
<tr>
<td>B2 BACnet; for 48 DT5-AT/LC Transmitters; 0–250 ppm CO (C5-BAC-48-48)</td>
</tr>
<tr>
<td>B3 BACnet; for 98 DT5 Transmitters; 0–100% (C5-BAC-98-1)</td>
</tr>
<tr>
<td>B4 BACnet; for 48 DT5-AT/LC Transmitters; 0–100% (C5-BAC-48-48-1)</td>
</tr>
<tr>
<td>L1 LON; for 56 DT5 Transmitters (C5-LON-DA)</td>
</tr>
<tr>
<td>L2 LON; for 98 DT5 Transmitters (2x = C5-LON-DA+DB)</td>
</tr>
<tr>
<td>L3 LON; for 28 DT5-AT Transmitters (C5-LON-NLA)</td>
</tr>
<tr>
<td>L4 LON; for 48 DT5-AT Transmitters (2x = C5-LON-NLA+NLB)</td>
</tr>
<tr>
<td>M0 Modbus; for DT5 or DT5-AT Transmitters (C5-MOD)</td>
</tr>
</tbody>
</table>

#### EP5-05 Relay/AO Expansion Modules

<table>
<thead>
<tr>
<th>Enclosure Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 None</td>
</tr>
<tr>
<td>1 (5) Relays / (2) 4-20 mA (1x EP5-05)</td>
</tr>
<tr>
<td>2 (10) Relays / (4) 4-20 mA (2x EP5-05 )</td>
</tr>
</tbody>
</table>

#### RS-485 Serial Port/Trunk Connections

<table>
<thead>
<tr>
<th>RS-485 GC5 Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 98 DT Transmitters (GC5-98)</td>
</tr>
<tr>
<td>2 48 DT-AT Transmitters (GC5-48-48)</td>
</tr>
<tr>
<td>3 98 DT Transmitters (w/ data logging)</td>
</tr>
<tr>
<td>4 48 DT-AT Transmitters (w/ data logging)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enclosure Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 None</td>
</tr>
<tr>
<td>1 Keylock with 2 Keys (ENCL-A)</td>
</tr>
<tr>
<td>2 Keylock with 2 Keys (ENCL-B)</td>
</tr>
<tr>
<td>3 Keylock with 2 Keys (ENCL-C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enclosure Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 1 DIN Rail / 1 Window (DGC5-Encl-A) “Small”</td>
</tr>
<tr>
<td>B 2 DIN Rails / 2 Windows (DGC5-Encl-B) “Medium”</td>
</tr>
<tr>
<td>C 3 DIN Rails / 3 Windows (DGC5-Encl-C) “Large”</td>
</tr>
</tbody>
</table>

#### Maximum Controller Options

<table>
<thead>
<tr>
<th>Maximum Controller Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Modules*</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Encl. “A”</td>
</tr>
<tr>
<td>Encl. “B”</td>
</tr>
<tr>
<td>Encl. “C”</td>
</tr>
</tbody>
</table>

* EP5-05, L1 & L3 = 1. L2 & L4 = 2
** CON5-A, B1, B2, B3, B4, M0

Basic central control unit, ordering part number:

**DGC5 - A02 - 1000 US**

Configuration includes:

- Small-sized panel enclosure, (1) DIN rail & (1) window door, NEMA 4X, power supply 90...250 VAC, digital programmable RS-485 GC5-48-48 controller for combo DT5 + AT transmitter inputs, with menu-driven keypad user interface, LCD & LEDs,

1. RS-485 CON5-A serial port/trunk connector

#### Inputs:

- Via RS-485 serial port(s); up to (48) remote DT5 digital communicating transmitters, each can be paired with one remote AT analog 4-20 mA transmitter
- (4) Digital inputs

#### Outputs:

- (5) Relays, SPDT, 8 A relay
- (2) 4-20 mA
- (1) 24 VDC, 0.5 A
- (1) Built-in horn

#### Note:

The DGC5 system, via RS-485 serial port(s), can be expanded to handle a maximum of (25) relays and (10) 4-20 mA outputs with optional remote relay/AO units:

REL5-5R-2A = (5) relays & (2) 4-20 mA outputs
REL5-2R-1A = (2) relays & (1) 4-20 mA outputs
Enclosure Types “A”, “B” and “C”

Expansion Configuration for DGC5-A, Enclosure “A”:
* Up to max (4) CON5-A RS-485 Serial Port/Trunk Connector Modules

Expansion Configuration for DGC5-B, Enclosure “B”:
* Up to max (4), possibly (8) CON5-A RS-485 Serial Port/Trunk Connector Modules
* (1), possibly (2) EP5-05 Realy/AO Expansion Modules
* (1), possibly (2) C5-... BACnet, LON, or Modbus Couplers

**Example of max space available for controller, modules and couplers:**
(1) GC5-98 + (5) CON5-A + (1) EP5-05 + (1) C5-...

Expansion Configuration for DGC5-C, Enclosure “C”:
* Up to max (4), possibly (8) CON5-A RS-485 Serial Port/Trunk Connector Modules
* (2), possibly (4) EP5-05 Realy/AO Expansion Modules
* (1), possibly (2) C5-... BACnet, LON, or Modbus Couplers

**Example of max space available for controller, modules and couplers:**
(1) GC5-98 + (4) CON5-A + (2) EP5-05 + (2) C5-...

LON Upwards Communication Couplers C5-LON-

Compatible with GC5-98 Controller for DT5 transmitter inputs:

- **C5-LON-DA LON Coupler:** > (56) SNVTs for DT5 transmitters (01-56)
  > (4) SNVTs for (20) digital relay status bits
  > (2) SNVTs for (2) analog values with minimum/average/maximum function

- **C5-LON-DB LON Coupler:** > (42) SNVTs for DT5 transmitters (57-98)
  > (6) SNVTs for (30) digital relay status bits
  > (12) SNVTs for (12) analog values with minimum/average/maximum function

Compatible with GC5-48-48 Controller for Combo DT5 + AT transmitter inputs:

- **C5-LON-NLA LON Coupler:** > (28) SNVTs for DT5 transmitters (01.1-28.1)
  > (28) SNVTs for AT transmitters (01.2-28.2)
  > (4) SNVTs for (20) digital relay status bits
  > (2) SNVTs for (2) analog values with minimum/average/maximum function

- **C5-LON-NLB LON Coupler:** > (20) SNVTs for DT5 transmitters (29.1-48.1)
  > (20) SNVTs for AT transmitters (29.2-48.2)
  > (6) SNVTs for (30) digital relay status bits
  > (12) SNVTs for (12) analog values with minimum/average/maximum function

**Note to ordering number “L2” and “L4” LON Coupler Combinations:**

C5-LON-DA and C5-LON-DB combination (L2) with GC5-98 controller; and
C5-LON-NLA and C5-LON-NLB combination (L4) with GC5-48-48 controller
provides total added SNVTs for sensor/transmitters points; but provides only
(6) SNVTs for six REL5-5R-2A relay/AO modules (total of 30 relays), and (12)
SNVTs for twelve 4-20 mA output signals.
PolyGard DGC5 Multi-Point RS-485 Digital Gas Detection and Control System

**DGC5 Central Control Unit**
- GC5-48-48 Control Module
  - Controller
  - User Interface: LCD, LED, Touch Buttons
  - (4) Digital Inputs
  - (5) SPDT Relay Outputs
  - (2) 4-20 mA Outputs
- EP5-05 Relay/AO Module “Optional”
  - (5) SPDT Relay Outputs
  - (2) 4-20 mA Outputs
- CONS-A RS-485 Serial Port/Trunk Module
  - Trunk/Bus Protector
  - 24 VDC Power Supply
- C5 Communication Coupler(s) “Optional”
  - BACnet, LON or Modbus Interface

**Max. (98) RS-485 Digital DT5 Transmitters**
or combination of
- (48) RS-485 Digital DT5 Transmitters
- (48) 4-20 mA Analog AT Transmitters
  (one “AT” connected via one “DT”)

**REL5-5R-2A-120 Remote Relay/AO Unit**
- (5) SPDT Relay Outputs, 8 A
- (2) 4-20 mA Outputs
- Transformer
  120/208/240, 24 VAC

**RS-485 & 24 VDC Power Trunk/Bus**
- Single 4-conductor multi-drop configuration
- 18 AWG wire size, shielded twisted pair
- Various lengths up to 2900 ft (900 m)
  depends on transmitter quantities and/or types
- No ground connection required for shielded cable, controller enclosure or remote transmitters

**REPS - PS1.5 Repeater & Power Booster Unit**
Required for:
- Trunk length over 2,900 ft (900 m)
- More than (20) bus subscribers/nodes
- 24 VDC power boosting

“Requires an external 24 VAC power supply”
**Keypad User Interface**

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Exit Programming" /></td>
<td>Exits programming; returns to the previous menu level.</td>
</tr>
<tr>
<td><img src="image" alt="Enter Sub Menus" /></td>
<td>Enters sub menus; saves parameter settings.</td>
</tr>
<tr>
<td><img src="image" alt="Scroll Up &amp; Down" /></td>
<td>Scrolls up &amp; down within a menu; changes a value.</td>
</tr>
<tr>
<td><img src="image" alt="Move Cursor" /></td>
<td>Moves the cursor position.</td>
</tr>
</tbody>
</table>

**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, %/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 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 averageing 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

---

Customer Services (858) 578-7887 & (888) GO INTEC
Fax (858) 578-4633 & (888) FX INTEC
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www.inteccontrols.com
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Page 7 of 10 Printed in USA 130613
FIELD WIRING CONFIGURATION

**120 VAC Input Power Supply**

- **AC hot**
- **AC neutral**
- **Earth ground**

- **Terminal block**
  - "Min wire size 16 AWG (1.5 mm²)"
  - Resettable breaker, max 10A, rated current approx. 2A

**Circuit Breaker 1F1**

**CON5-A**

**C5 Communication Coupler**

- Optional: **LON**
- Optional: **BACnet**
- Optional: **Modbus**

**INTEC**

**Power Fault**

**Alarm 1** **Alarm 2**

**INTEC**

**24 VDC Output**

**RS-485 Communication**

- Factory wired

**DIN Rail**

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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

 XO = Relay status LEDs D1 to D5 located below terminal connection block X10

24 VDC Output Supply

(+)

24 VDC max 0.5A

for remote alarm display units

Terminal block X1

Digital Inputs “DI01 to DI04”

X11

Analog Outputs “AO01 to AO02”

4-20 mA signal to remote control or BAS, selectable current or averaging, 500 Ω max. load

The current signal is sourced by the DGC5 system

C5 Communication Coupler, LON

A B

X11 C5 coupler

(A) Upwards LON communication to BAS

C5 Communication Coupler, BACnet

RJ45

Upwards BACnet communication to BAS

C5 Communication Coupler, Modbus

A B

X2 C5 coupler

(A) RS-485, Modbus protocol

(-) must connect to the (-) at the BAS- System

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Page 9 of 10 Printed in USA 130613
FIELD WIRING CONFIGURATION (CONT...)

RS-485 Communication and
24 VDC Power Output Port Connections

Notes:
• Do not connect power to A and B, this may damage the transmitters and possibly the trunk/bus protector CON module linked on the daisy-chain trunk.
• Daisy-chain between transmitters and CON module A to A, B to B. Do not cross A to B, this creates malfunction of communication.
• Do not use high voltage lines in the same RS-485 communication cable conduit.