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.

APPLICATION

To control and alarm upon the presence of any toxic, combustible and refrigerant gases. A combination of the RS-485 communicating DT5-11/3300 series, and analog AT-11/3300 series or other 4-20 mA transmitters piggybacked via a digital DT-.. transmitter, can be connected to the control unit. The controller can interface via binary outputs, 4-20 mA signals, and an optional BACnet® or Modbus coupler with any compatible electronic control, DDC/PLC control or automation system.

FEATURES

• Continuous monitoring
• Up to (16) remote RS-485 digital communicating transmitter inputs; or combination of (8) RS-485 digital & (8) 4-20 mA analog transmitters
• Up to twelve (12) relay outputs:
  - Four-stage control
  - Fail-safe assignable
• Up to five (5) analog outputs, 4-20 mA:
  - Selectable for low, high or averaging
• Onboard inputs/outputs, one (1) each:
  - Analog output (0)4-20 mA / (0)2-10 VDC
  - Digital input
  - SPDT relay 0.5 A
  - SPST relay (N.O./N.C.), 0.5 A
  - Open collector output, 50 mA, 30 V max.
• One (1) 24 V DC supply output
• Built-in horn
• Accepts combination of toxic or combustible gases, refrigerants, temperature or humidity sensor inputs
• Optional BACnet® or Modbus coupler upwards communication to BAS (external)
• Liquid Crystal Display (LCD)
• LED status indicators
• Keypad user interface
• Simple menu-driven programming
• Modular technology
• Overload & short-circuit protected
• Resettable breaker
• NEMA 4X (IP65) enclosure
• Easy maintenance

SPECIFICATIONS

Electric

Power supply 18-28 VDC, reverse polarity protected
Power consumption 2.5 VA, max.
Type of Control

General

Four-stage (S1 to S4) control, assignable up to fourteen (14) binary/relay outputs, i.e.
Low-high-fault/fail-horn*, or low1-low2-med-high, or any other combinations
(* = horn/audible alarm built-in and factory pre-configured to relay output “R03”)

Digital inputs/outputs, serial communications

- standard (1) RS-485 parallel port, proprietary protocol, single 4-conductor multi-drop configuration link
- protection Current limitation and over voltage
- device configuration (16) remote RS-485 digital DT5 transmitters; or (8) remote RS-485 digital DT5 transmitters with (8) remote 4-20 mA analog AT transmitters; up to (14) relays and (5) analog outputs per system
**SPECIFICATIONS**

**Type of Control (cont…)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage level / setpoint</td>
<td>Field adjustable over full range, four (4) per transmitter input, assignable to current or mean (average) value</td>
</tr>
<tr>
<td>- hysteresis/switching differential</td>
<td>Selectable for each sensor point</td>
</tr>
<tr>
<td>Digital input</td>
<td>One (1), can be individually assigned to any relay; or override function</td>
</tr>
<tr>
<td>- application</td>
<td>Remote audio/visual alarm reset</td>
</tr>
<tr>
<td>Relay outputs w/status LEDs</td>
<td>One (1) SPDT, 0.5 A, 30 VAC/VDC; One (1) SPST, N.O./N.C., 0.5 A, 30 VAC/VDC</td>
</tr>
<tr>
<td>- standard</td>
<td>Assignable to any stage level</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 break of each sensor point (SP) 0-9,999 seconds</td>
</tr>
<tr>
<td>VDC output supply</td>
<td>24 VDC, 0.05 A fused</td>
</tr>
<tr>
<td>Analog output</td>
<td>(0)4-20 mA, 500 Ω max. load, or (0)2-10 VDC, ≥50k Ω, selectable as low, high or averaging of sensor input</td>
</tr>
<tr>
<td>Audible alarm</td>
<td>83 db (0.6 ft), 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>
<tr>
<td><strong>User Interface</strong></td>
<td></td>
</tr>
<tr>
<td>Touch buttons</td>
<td>Four (4)</td>
</tr>
<tr>
<td>Status LED's</td>
<td>Four (4)</td>
</tr>
<tr>
<td>Digital display</td>
<td>Liquid Crystal Display (LCD), two lines, 16 characters per line, 1 digit resolution, backlit</td>
</tr>
<tr>
<td>- unit display</td>
<td>Menu selectable, per sensor; ppm, %v/v, %LEL, °F or %RH</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td></td>
</tr>
<tr>
<td>Permissible ambient</td>
<td>28°F to 104°F (-5°C to 40°C)</td>
</tr>
<tr>
<td>- working temperature</td>
<td>-4°F to 104°F (-20°C to 40°C)</td>
</tr>
<tr>
<td>- storage temperature</td>
<td>15 to 90% RH, non-condensing</td>
</tr>
<tr>
<td>- humidity</td>
<td>Atmospheric ± 10%</td>
</tr>
<tr>
<td>- working pressure</td>
<td></td>
</tr>
<tr>
<td><strong>Physical</strong></td>
<td></td>
</tr>
<tr>
<td>Enclosure (panel)</td>
<td>Polycarbonate, impact resistance EN 50102/IK08, flammability rating UL 94 v2</td>
</tr>
<tr>
<td>- material</td>
<td>Light gray</td>
</tr>
<tr>
<td>- color</td>
<td>NEMA 4X (IP65)</td>
</tr>
<tr>
<td>- protection</td>
<td>Wall (surface) mounted</td>
</tr>
<tr>
<td>- installation</td>
<td></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, covered</td>
</tr>
</tbody>
</table>

**Wire Connection** | Terminal blocks, Push-on connect and screw type for lead wire |
**Wire size** | Min. 24 AWG (0.25 mm²) Max. 14 AWG (2.5 mm²) |
**Weight** | 1.3 lb (0.6 kg) |

**Approvals / Listings**

- **unit rating**
  NRTL Perf. Tested & Certified
  Conforms to STD ANSI/UL 2075 CE
  VDI 2053, C-No. 418791
  EMC-Compliance 2004/108/EWG

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

**Warranty**

Two years material and workmanship

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGC3-10-100US</td>
<td>Multi-Point Gas Detector/Controller, configured for (16) DT5-series Transmitter Inputs</td>
</tr>
<tr>
<td>DGC3-20-100US</td>
<td>Multi-Point Gas Detector/Controller, configured for (8) DT5-series and (8) AT-series Transmitter Inputs</td>
</tr>
<tr>
<td>DPT5</td>
<td>Digital Programming Tool Kit for DT5 Transmitters</td>
</tr>
</tbody>
</table>

**COMMUNICATION OPTIONS**

Standalone gas transmitter gateway modules for real-time connection to a building automation system (BAS), DDC, or other monitoring/control system; NEMA 4X enclosure, 24 VDC.

Note that the DGC3 Controller is limited to 16 digital or 8 digital + 8 analog transmitters.

- **T5-BAC-1-A**
  BACnet®-IP Gateway; for ≤ 98 DT5-series transmitters, 0-250 ppm CO

- **T5-BAC-2-A**
  BACnet®-IP Gateway; for ≤ 48 DT5-series + 48 analog trans., 0-250 ppm CO

- **T5-BAC-3-A**
  BACnet®-IP Gateway; for ≤ 98 DT5-series transmitters, 0-100%

- **T5-BAC-4-A**
  BACnet®-IP Gateway; for ≤ 48 DT5-series + 48 analog trans., 0-100%

- **T5-MOD-0-A**
  MODBUS Gateway
PolyGard DGC3 Multi-Point RS-485 Digital Gas Detection and Control System

**DGC3 Central Control Unit**

- **Upwards Communication, BACnet or Modbus**

**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
- Bus cable must conform to “line” topology. Branches or “T’s” are not permitted.
- 560 Ω termination resistor must be installed between terminals 6 & 7 on last DT5 transmitter on Bus.

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

**REP5 - PS1.5 Repeater & Power Booster Unit**
- Max. (16) RS-485 Digital DT5 Transmitters or combination of (8) RS-485 Digital DT5 Transmitters and (8) 4-20 mA Analog AT Transmitters (one “AT” connected via one “DT5”)

**Digital Service via Laptop**

**Notes**:
- Requires an external 24 VAC power supply
- Max. trunk length without repeater/power booster depends on system configuration.
- CO and CO/NO2 detection systems with 50’ spacing with or without remote relays do not require repeater/power booster.
- Consult INTEC for max. trunk length for other sensor/transmitter configurations
**USER INTERFACE & CONTROLLER**

**Keypad User Interface**

- **Alarm 1** ("Orange LED"): Flashes when any stage level setpoint is exceeded; steady when any relay output is in manual override operation.
- **Alarm 2** ("Red LED"): Flashes when high alarm stage 2 or multiple alarm stage level setpoints are exceeded; steady when any relay output is in manual override operation.
- **Failure** ("Yellow LED"): Flashes when system or sensor fails.
- **Power** ("Green LED"): Steady when power is ON.

**Main Page & Main Menu**

- Exit programming mode and saves settings; return to previous level or menu.
- Enter Main Menus; scrolls through Main Menus and Sub Menus; increase or decrease a value.
- Navigates through menus on the same level; moves cursor when inputing data.
- Enter Sub Menus; accepts and stores data; silence horn (if assigned).

**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 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
- Set failure relay
- Select power ON time
- Select analog output function
FIELD WIRING CONFIGURATION

DGC3 Connection Diagram

- 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
- Bus cable must conform to “line” topology. Branches or “Ts” are not permitted.
- 560 Ω termination resistor must be installed between terminals 6 & 7 on last DT5 transmitter on Bus.

RS-485 digital DT5 transmitter series

R1 = SPDT, 30 VAC/DC, 0.5 A
R2 = SPNO/SPNC, 30 VAC/DC, 0.5 A
R4 = Open Collector, 30 VDC, 50 mA

**Jumper SPST relay (R2) NC/NO selector:
- Covers top two pins = SPST-NC
- Covers bottom two pins = SPST-NO

Notes:
- Do not connect power to A and B, this may damage the transmitters and possibly the controller.
- Daisy-chain between transmitters and controller A to A, B to B. Do not cross A to B, this creates a malfunction of communication.
- Do not use high voltage lines in the same RS-485 communication cable conduit.
- Install 560 Ω termination resistor between A and B on last transmitter on Bus.