Multi-Point Digital Gas Detection and Control System

PolyGard®2 DGC6

DESCRIPTION

Highly configurable controller for up to 96 sensors distributed on a robust RS-485 bus. Programmed with user-friendly PC software or via front panel pushbuttons, the DGC6 can be used for single- or multi-zone applications with on-off or variable speed fan controls.

With advanced hardware and software diagnostics and certification to the rigorous EN 50545-1 international standard for parking garages and tunnels, the DGC6 redefines best-in-class performance for safety, reliability and energy efficiency.

The DGC6 controller operates in conjunction with DT6-, DR6- and DC6- sensors and sensor / controllers to provide cost effective solutions for any project. These EN 50545-1 certified field devices utilize advanced, self-diagnosing X-Change technology for maximum reliability and minimum life-cycle cost.

The addition of trunk repeater modules allow for flexible communication bus and power distribution routing.

Enclosure "Type A"

- EMC Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU
- EN 50545-1
- EN 50271
- EN 61010-1:2010
- ANSI/UL 61010-1
- CAN/CSA-C22.2 No. 61010-1
- City of Los Angeles Approved
- California Title 24 Compliant

APPLICATION

To control and alarm upon the presence of any toxic, combustible and refrigerant gases in parking garages, vehicle maintenance facilities, package distribution centers, tunnels, chiller/boiler rooms, laboratories, and more. The controller interfaces via binary outputs, 4-20 mA signals, and/or optional BACnet-IP and/or Modbus-RTU port with any compatible electronic control, DDC/PLC control or building automation system.

FEATURES

- *Up to (96) PolyGard®2 digital sensors, or combination of PolyGard®2 digital sensors and 4-20 mA analog sensors*
- *Over (50) toxic, combustible and refrigerant gas sensors available in DT6-, DR6- and DC6-Series sensors and sensor/controllers*
- *User-friendly setup of ventilation zones and control / alarm thresholds*
- *Occupancy schedules and zone-based diagnostics (CA Title 24 Compliance)*
- *Four (4) programmable alarm thresholds per sensor*
- *Four (4) digital inputs*
- *Multiple alarm relays configurable per alarm*
- *Four-level password protection*
- *Latching mode alarms resettable via digital input*
- *Flexible sensor lockout function to prevent nuisance alarms during service*
- *Alarm actions on rising or falling sensor readings*
- *Personal computer connection for easy programming and program archiving*
- *Max. (32) SPDT alarm relays (local plus remote), dry contact, max. 250 VAC, 5 A*
- *Max. (96) signal relays (availability is determined by digital sensors on connected DC6 Controllers)*
- *Fault relay with SPST normally open contact, max. 250 VAC, 5 A*
- *Max. 16 analog outputs (local plus remote), 4-20 mA, with scalable signal output, supervised, for service mode, system or sensor faults, etc.*
- *Integrated warning horn for alarms and faults*
- *Data logging function, optional*
- *Modbus-RTU and/or BACnet-IP gateways, optional*
- *High-impact NEMA 4X (IP65) enclosure*
- *Hardware & software conforms to SIL 2 standard*

SPECIFICATIONS

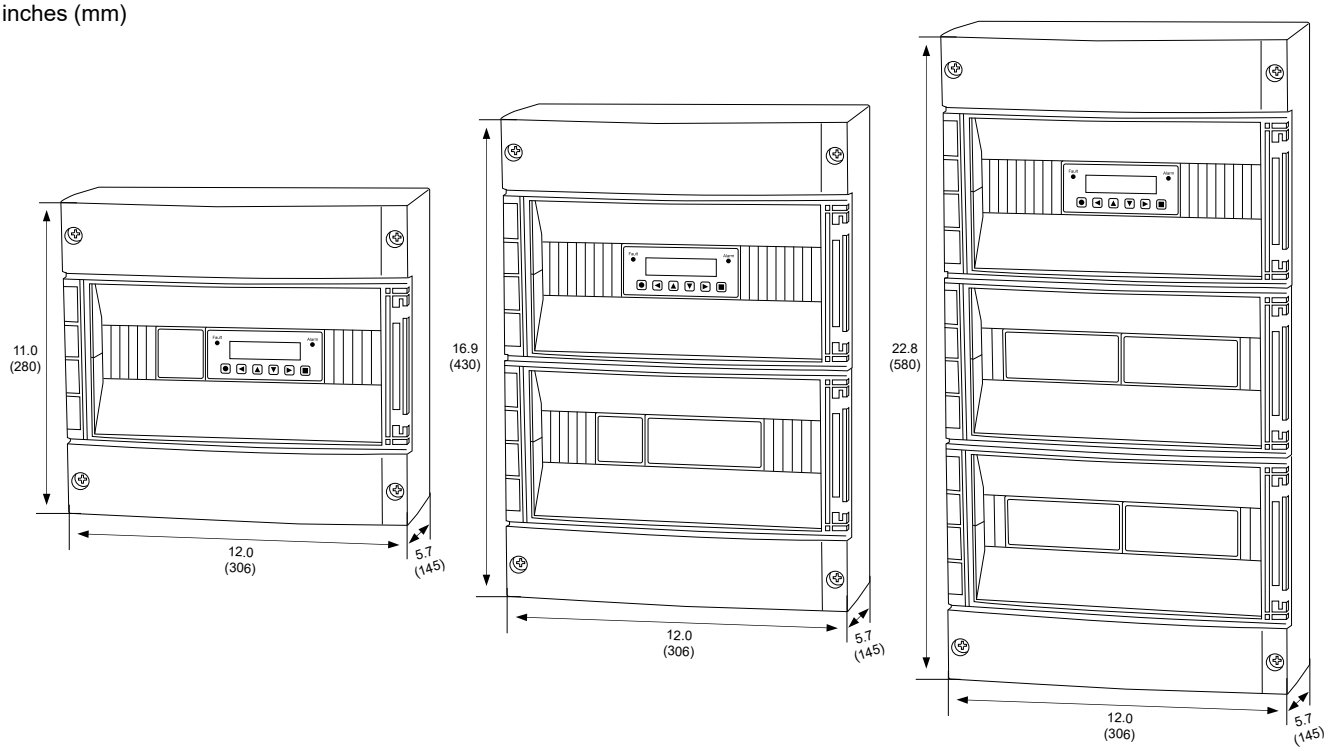
Electrical	
Power supply	110/230 VAC 50/60 Hz; 24 VDC ± 20%
Power consumption (incl. sensors)	Min. 30 W, 0.15 A, Max. 160 W, 0.7 A Depending on type and configuration
Device configuration	(96) PolyGard®2 digital sensors, or combination of PolyGard®2 digital sensors and 4-20 mA analog sensors
Stage level / setpoint	Four (4) alarm thresholds per sensor input, assignable to current or mean (average) value
Digital inputs	Four (4), each can be individually assigned to any relay
- application	Remote audio/visual alarm reset or override function
Analog outputs configurable for each input	(16) max., local plus remote, proportional, overload and short-circuit- protected, ext. load resistance ≤ 500 Ω 4-20 mA = measuring range; 3.0 < 4 mA = under range; > 20-21.2 mA = over range; 2.0 mA = fault
Fault relay	(1) 250 VAC, 5 A, normally closed, dry contact, SPST
Alarm relays	(32) max., local plus remote, 250 VAC, 5 A, normally open, dry contact, SPDT
Operation Interface	
LCD	Two lines, 16 characters each, illuminated
Status LED (4)	Green: Power-on Yellow: Fault (fail) Orange: 1st Alarm Red: 2nd Alarm
Operation	Six (6) push-buttons
Interface Field Bus	
Transceiver	RS-485 / 19200 Baud
Gases	Digital PolyGard®2 and analog sensors for toxic, combustible & refrigerant gases
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 94-5V
- conforms to	UL Type 1, UL 508 / UL 50 standards
- color	Light gray, smoked gray for cover
- protection	NEMA 4X (IP65)
- installation	Wall (surface) mounted
Cable entry, knock outs	10 holes for 1/2 in. conduit on top
Wire connections	Terminal blocks, Push-on connect and screw type for lead wire
Wire size	
- power supply input	Min. 16 AWG (1.5 mm^2) Max. 14 AWG (2.5 mm^2)
- inputs/outputs	Min. 20 AWG (0.5 mm^2) Max. 16 AWG (1.5 mm^2)
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 lb (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 lb (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 lb (6.2 kg)
Audible Alarm (Buzzer)	Built-in
Acoustic pressure	85 db (distance 10 ft)
Frequency	3.5 kHz
Conforms to	EMC Directive 2014/30/EU Low Voltage Directive 2014/35/EU EN 50545-1, EN 50271 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1 City of Los Angeles California Title 24
Warranty	Two years material and workmanship

OPTIONS

Data Logger	Storage of measured values, of alarm status and faults with time and date stamp on an USB flash drive; log rate adjustable from 10 to 10,000 sec; output of the data in standard Excel format
Interface Modbus-RTU	Transmission of current and average values, alarm and relay status, and analog output states in Modbus-RTU RS-485 protocol to external devices
Interface BACnet-IP	Technical data, function and protocol see datasheet C6-BAC
Keylock	“GC-LOCK”; keylock order separately per Encl Type: A=1, B=2, C=3

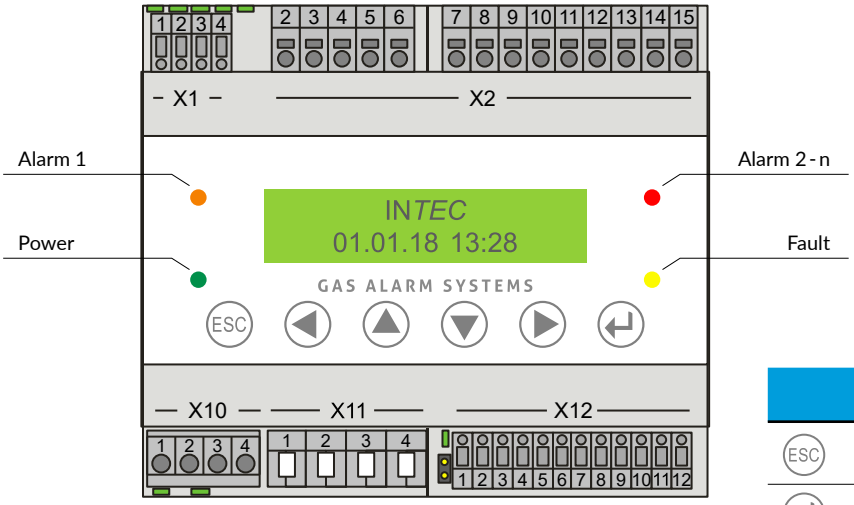
DIMENSIONS

inches (mm)



USER INTERFACE & CONTROLLER

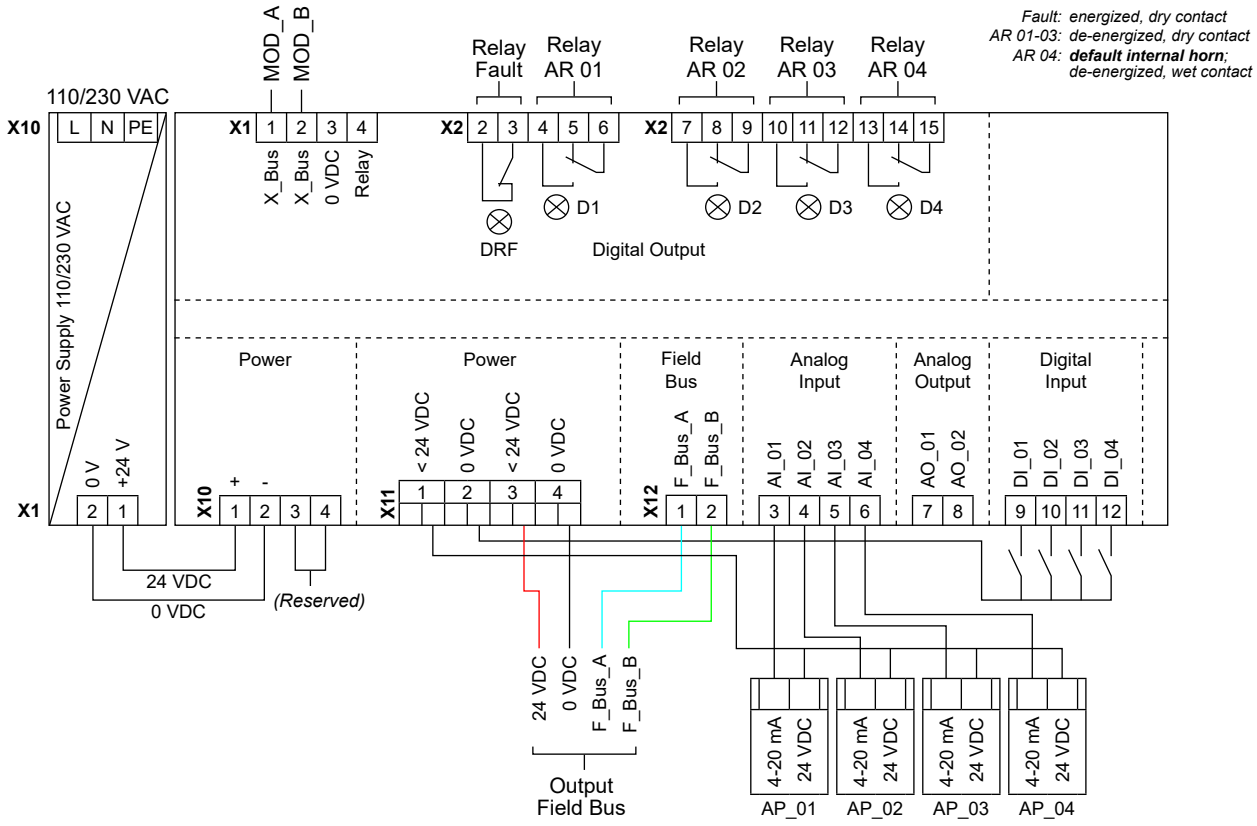
GC-06 Built-in Controller Programming Module



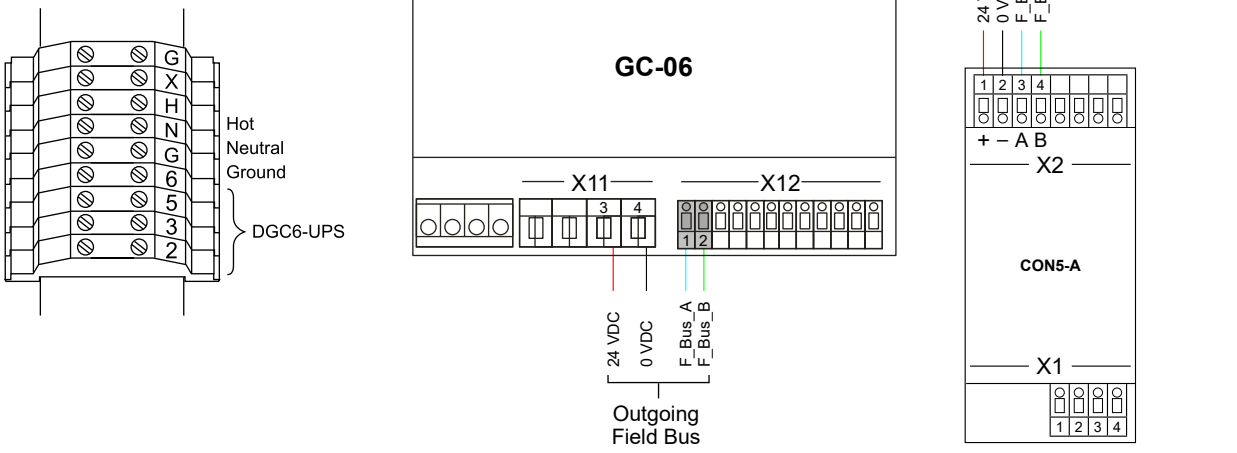
KEYPAD FUNCTIONS *See DGC6 User Manual for Guidance*	
ESC	• Exits programming • Returns to the previous menu level
↵	• Enters sub menus • Saves parameter settings
▲ ▼	• Scrolls up and down within a menu • Changes a value
◀ ▶	• Moves the cursor position

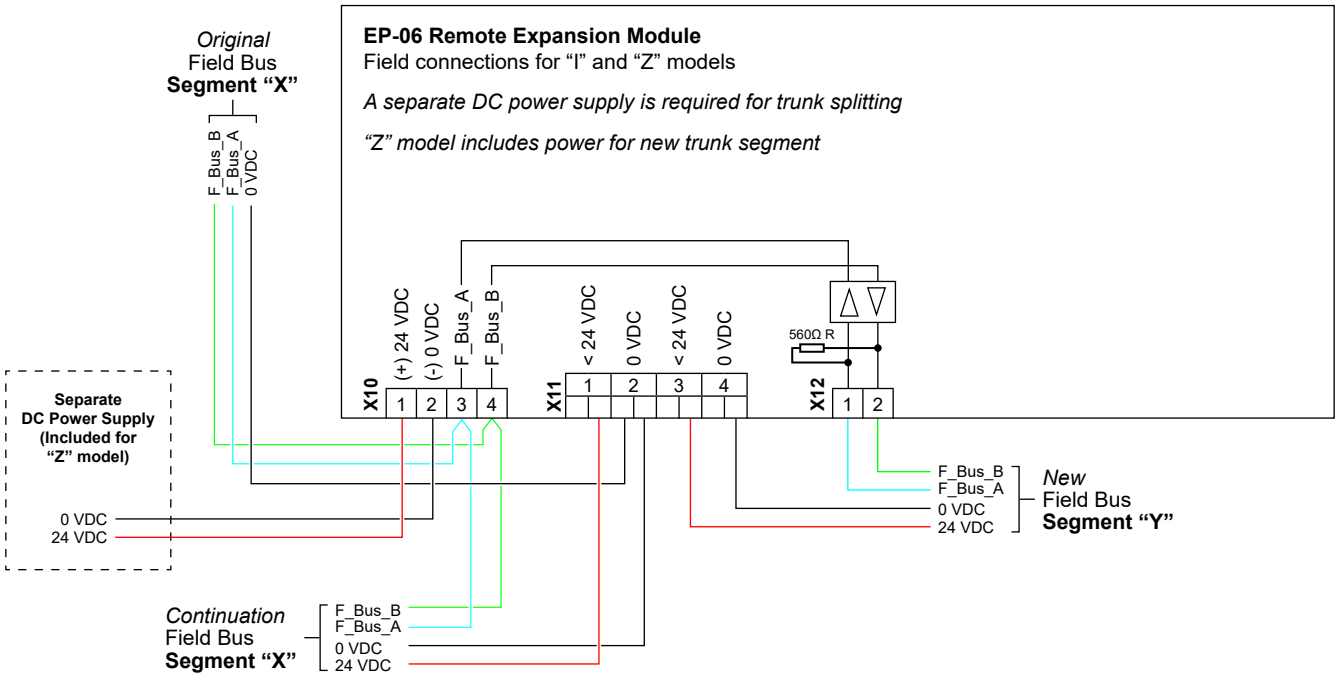
WIRING CONFIGURATION

GC-06



FIELD BUS CONNECTIONS





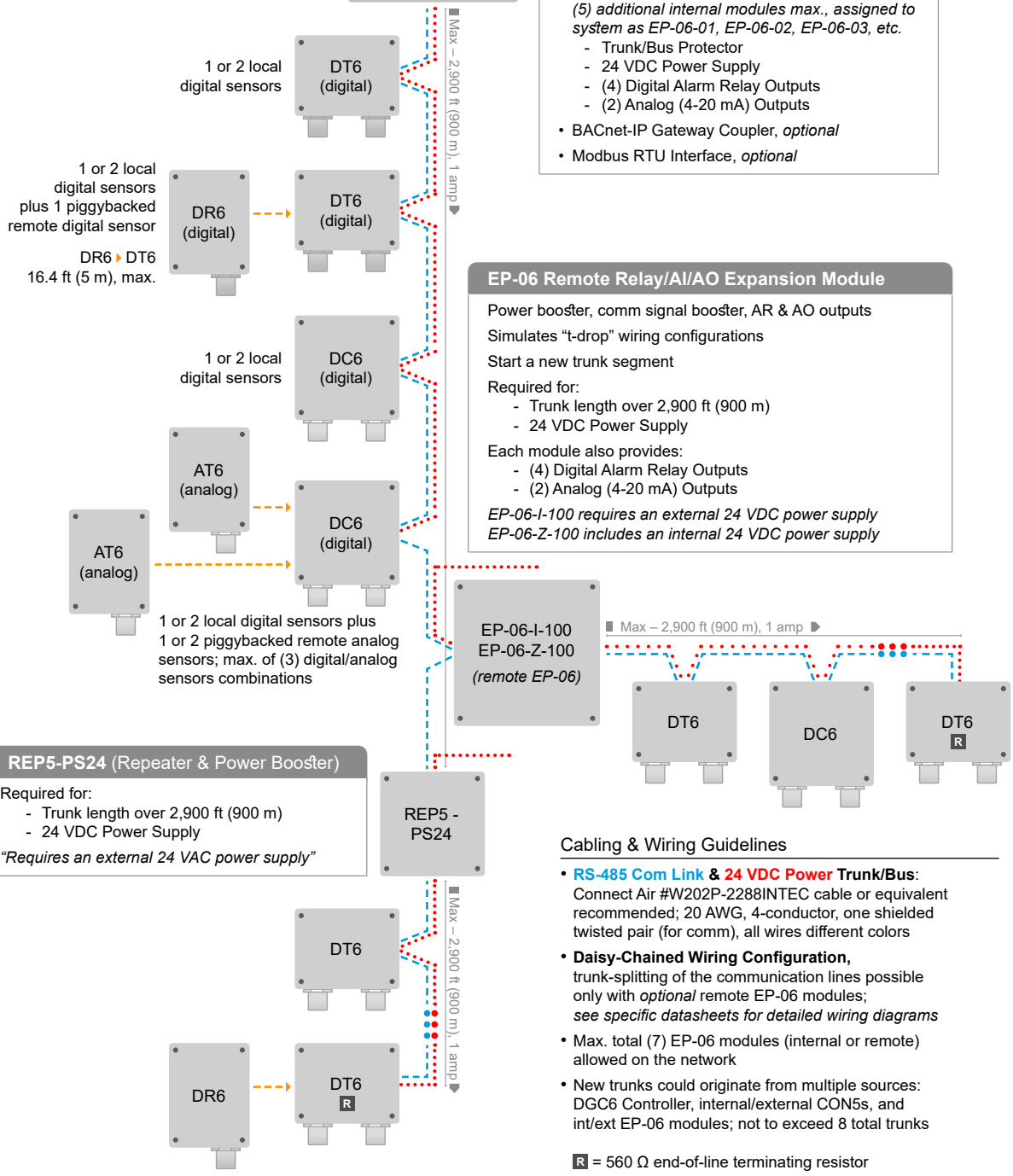
PolyGard®2 DGC6 Multi-Point RS-485 Digital Gas Detection and Control System Network Overview

Up to 96 PolyGard®2 daisy-chained digital sensors (DT6-/DR6-/DC6-Series), or combination of DC6 digital sensors with piggybacked AT6 analog sensors

1 or 2 digital sensors for DT6- or DC6-Series;
1 digital sensor for DR6-Series;
1 analog sensor for AT6-Series

DGC6 Central Control Unit

- GC-06 Built-in Controller Programming Module
  - User Interface: LCD, LED, Touch Buttons
  - Trunk/Bus Protector
  - 24 VDC Power Supply
  - (4) Digital Inputs
  - (4) Digital Alarm Relay Outputs
  - (2) Analog (4-20 mA) Outputs
- CON5-A RS-485 Trunk Module, *optional*
  - Trunk/Bus Protector
  - 24 VDC Power Supply
- EP-06 Trunk/Relay/AI/AO Expansion, *optional; (5) additional internal modules max., assigned to system as EP-06-01, EP-06-02, EP-06-03, etc.*
  - Trunk/Bus Protector
  - 24 VDC Power Supply
  - (4) Digital Alarm Relay Outputs
  - (2) Analog (4-20 mA) Outputs
- BACnet-IP Gateway Coupler, *optional*
- Modbus RTU Interface, *optional*



EP-06 Remote Relay/AI/AO Expansion Module

Power booster, comm signal booster, AR & AO outputs

Simulates "t-drop" wiring configurations

Start a new trunk segment

Required for:
- Trunk length over 2,900 ft (900 m)
- 24 VDC Power Supply

Each module also provides:
- (4) Digital Alarm Relay Outputs
- (2) Analog (4-20 mA) Outputs

EP-06-I-100 requires an external 24 VDC power supply
EP-06-Z-100 includes an internal 24 VDC power supply

REP5-PS24 (Repeater & Power Booster)

Required for:
- Trunk length over 2,900 ft (900 m)
- 24 VDC Power Supply

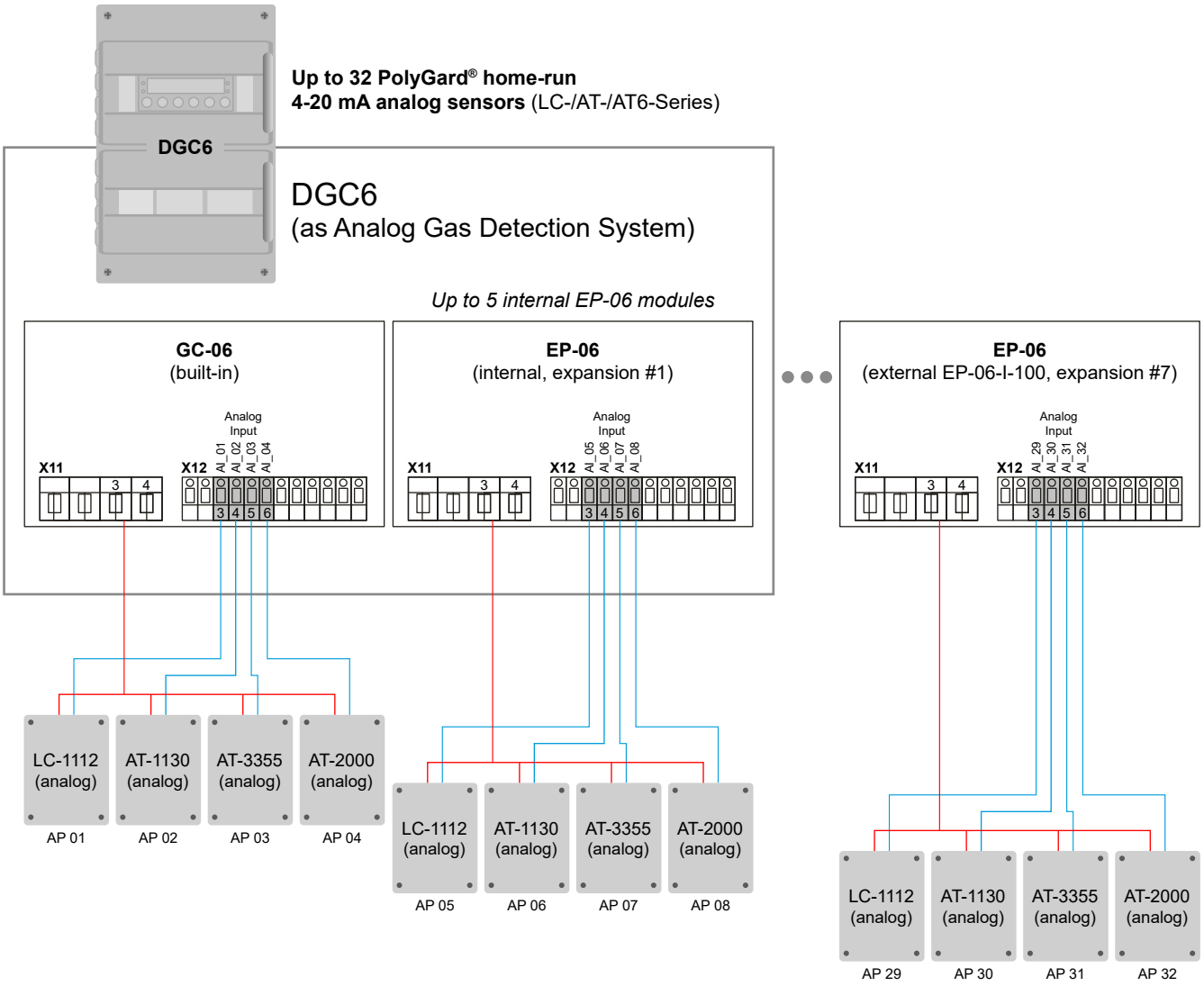
"Requires an external 24 VAC power supply"

Cabling & Wiring Guidelines

- **RS-485 Com Link & 24 VDC Power Trunk/Bus**: Connect Air #W202P-2288INTEC cable or equivalent recommended; 20 AWG, 4-conductor, one shielded twisted pair (for comm), all wires different colors
- **Daisy-Chained Wiring Configuration,** trunk-splitting of the communication lines possible only with *optional* remote EP-06 modules; *see specific datasheets for detailed wiring diagrams*
- Max. total (7) EP-06 modules (internal or remote) allowed on the network
- New trunks could originate from multiple sources: DGC6 Controller, internal/external CON5s, and int/ext EP-06 modules; not to exceed 8 total trunks

R = 560 Ω end-of-line terminating resistor

PolyGard®2 DGC6 Multi-Point Analog Gas Detection and Control System Network Overview



Cabling & Wiring Guidelines

- **Analog Link & 24 VDC Power Trunk/Bus**: 4-20 mA signal devices; two wires, different colors
- **Home-run Wiring Configuration Only**
- Max. total (7) EP-06 modules (internal & external) allowed; not to exceed 8 total trunks

External
Part # EP-06-I-100

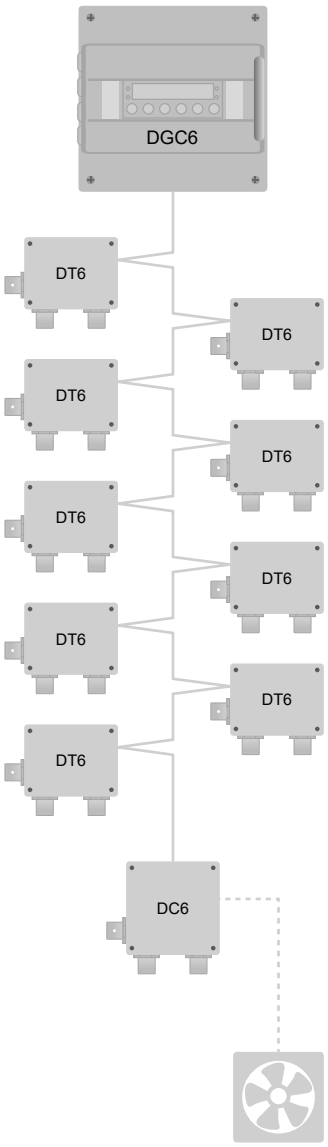
Address Assignment Table EP-06 Modules				
EP Number	EP Address	AP Address	Relay Number	Analog Output Number
01	01	05-08	05-08	03-04
02	02	09-12	09-12	05-06
03	03	13-16	13-16	07-08
04	04	17-20	17-20	09-10
05	05	21-24	21-24	11-12
06	06	25-28	25-28	13-14
07	07	29-32	29-32	15-16

TYPICAL SYSTEM CONFIGURATIONS

One Floor
Single Ventilation Zone

- CO and NO_2
- ~50,000 sqft / 200 parking spaces

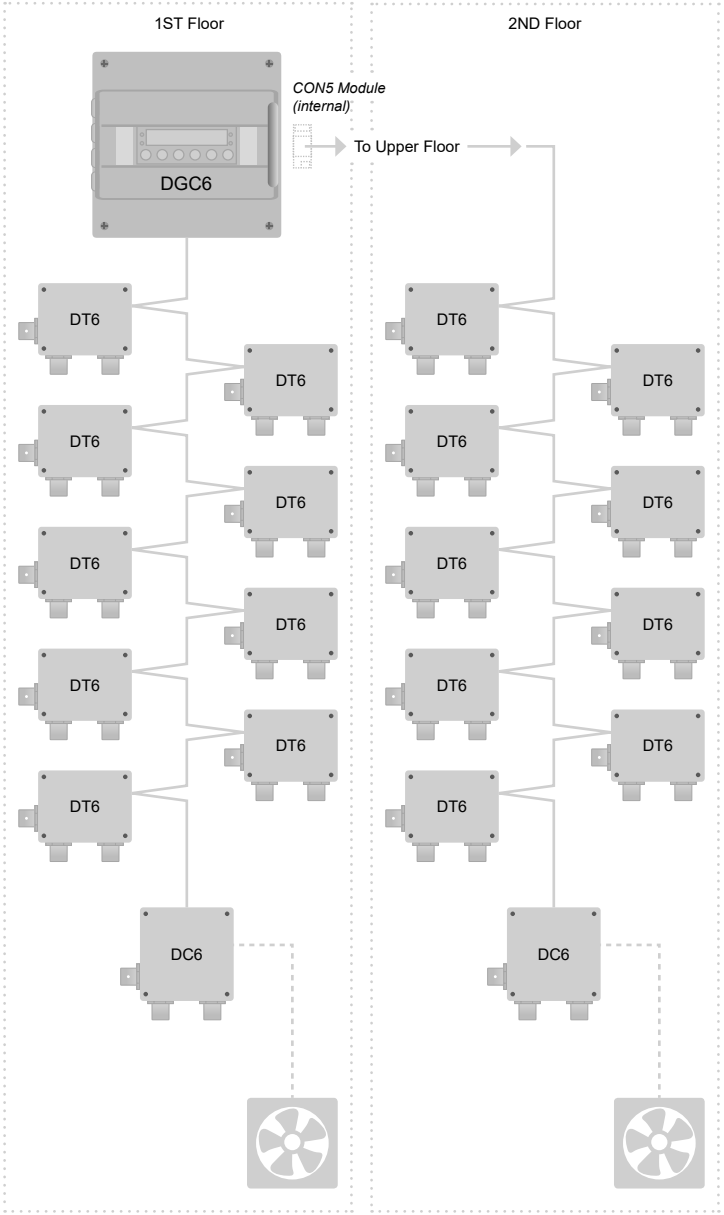
Part Numbers	
(1)	DGC6-A-00-0000US *– Digital Gas Controller*
(9)	DT6-E1110-E-E1130-B-32 *– CO/NO_2 Combo w/Horn+LED option*
(1)	DC6-E1110-E-E1130-B-43 *– CO/NO_2 Combo w/Horn+LED option*



Two Floors
Two Ventilation Zones

- CO and NO_2
- ~100,000 sqft / 400 parking spaces

Part Numbers	
(1)	DGC6-A-00-1000US *– Digital Gas Controller + (1) CON5 Module*
(18)	DT6-E1110-E-E1130-B-32 *– CO/NO_2 Combo w/Horn+LED option*
(2)	DC6-E1110-E-E1130-B-43 *– CO/NO_2 Combo w/Horn+LED option*

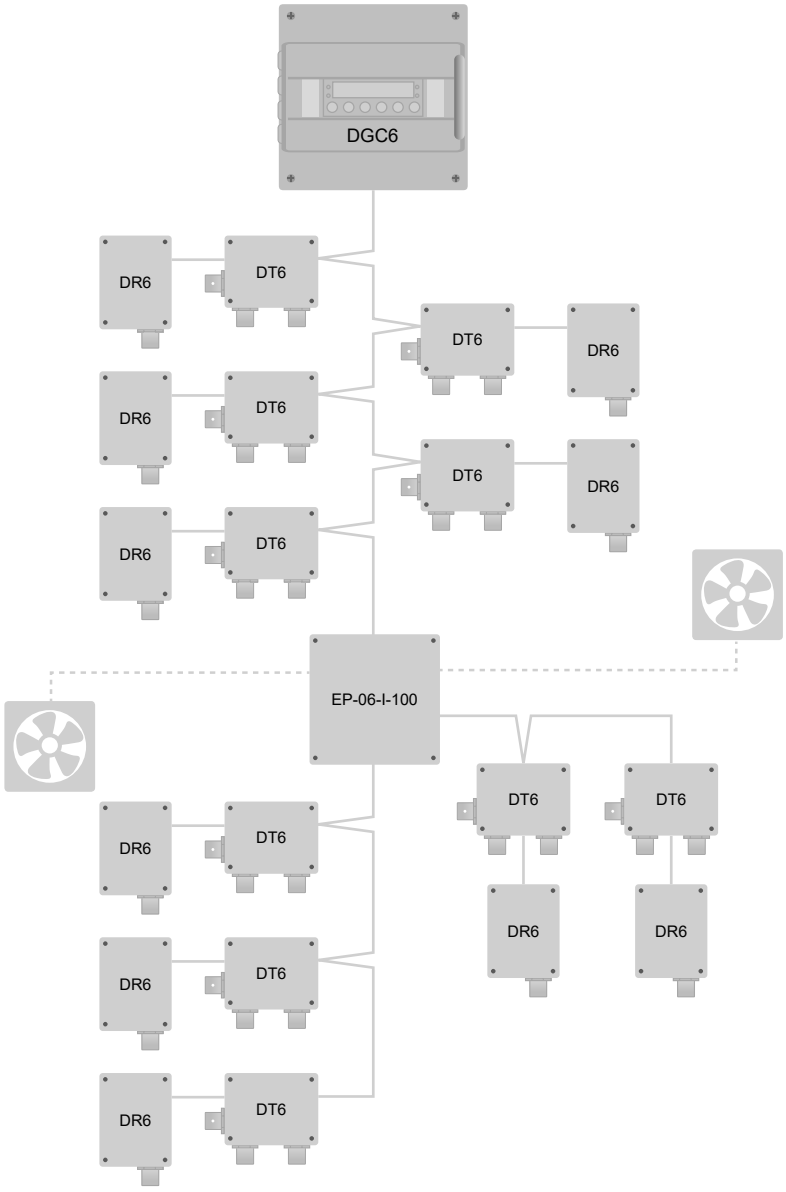


TYPICAL SYSTEM CONFIGURATIONS (CONT...)

Package Sorting Facility
One Ventilation Zone

- CO and NO_2 and Methane
- ~XXXX sqft / XXXX parking spaces

Part Numbers	
(1)	DGC6-A-00-0000US *– Digital Gas Controller*
(10)	DT6-E1110-E-E1130-B-32 *– CO/NO_2 Combo w/Horn+LED option*
(10)	DR6-P3400-A *- Methane*
(1)	EP-06-I-100 *– Remote Relay/AI/AO Expansion Module*



ORDERING INFORMATION

DGC6 - X - 0X - XXXXUS

Communication Gateway Options		
		SU Req.
00*	No Option	0
B1	BACnet-IP *(See Table for Max I/O)*	1
B2		1
M0	Modbus-RTU *(Internal)*	0

* Standard

BACnet-IP Options		
	B1	B2*
Digital Gas Sensors	96	75
Analog Inputs	32	0
Signal Relays	0	75
Alarm Relays	32	32
Analog Outputs	16	16
Failure Relay	1	1

** Adding a B2 gateway will reduce the total number of sensors on the network from 96 to 75 max.*

Data Logging		
		SU Req.
0*	No Option	0
L	Data Logging	0

* Standard

RS-485 Serial Port/Trunk Connections		
		SU Req.
0*	Built-in (1) Trunk Module	0
1-7	CON5 Module	1 per

If desiring additional trunk with relays add EP-06 instead; not to exceed 8 total trunks

* Standard

EP-06 Trunk/Relay/AO/AI Expansion Modules				
	Alarm Relays	Analog Outputs	Analog Inputs	SU Req.
0*	04	02	04	0
1	08	04	08	3
2	12	06	12	6
3	16	08	16	9
4	20	10	20	12
5	24	12	24	15

Each EP-06 Expansion Module provides (4) Alarm Relays, (2) Analog Outputs and (4) Analog Inputs; (5) local modules within DGC6 possible

If desiring just additional trunk add CON5 instead; not to exceed 8 total trunks

* Standard

Enclosure Type		
		Space Unit (SU) Available, Max.
A*	1 DIN Rail / 1 Window (Encl-A) "Small"	3
B	2 DIN Rails / 2 Windows(Encl-B) "Medium"	9
C	3 DIN Rails / 3 Windows(Encl-C) "Large"	15

* Standard

"GC-LOCK" – *Keylock Order Separately*	
1	Keylock with 2 Keys for Encl-A
2	Keylock with 2 Keys for Encl-B
3	Keylock with 2 Keys for Encl-C

Ordering Guide Steps

*1) **EP-06 Relay/AO Expansion Modules and Trunks.** Determine the number of Alarm Relays and Analog Outputs and choose the appropriate (additional) EP-06 Expansion Modules and Trunks. Note the Space Units (SU) required.*

*2) **Communication Gateway and other options**. Include a Communication Gateway if needed; a BACnet gateway occupies "1" Space Unit, while a Modbus gateway will be integrated with the main controller module and requires "0" Space Unit. Data Logger requires "0" Space Unit.*

*3) **Enclosure Type**. Sum the Space Units from Step 1 and Step 2, and choose an adequate enclosure.*

Example - Ordering Part Number:

DGC6-A-00-2LB1US

Configuration includes:

- Housing: • Encl-A "Small", 11.0 x 12.0 x 5.7 in.
- ARs/AOs: • (0) Standard, (4) Alarm Relays, max., (2) Analog Outputs, max.
- Trunks: • (2) CON5 Modules; 3 Total Trunks
- D/L: • Data Logging
- Gateway: • BACnet-IP, B1