

Multi-Point Digital Gas Detection and Control System

Specifications subject to change without notice. | USA 151009 | Page 1 of 10



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/or optional BACnet, LON or Modbus port 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 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

Power supply 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

General 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,

Digital inputs/outputs, serial communications

- standard
- optional, add-ons

- protection

or any other combinations
(* = horn/audible alarm built-in and factory pre-configured to relay output "R05")

(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

PolyGard DGC5



Enclosure "Type B"



City of Los Angeles Approved



NRTL Tested & Certified
Conforms to STD
UL 2017

UL 2075 certified PolyGard Carbon Monoxide & Combustible Gas Transmitters are recommended for maximum system performance and reliability

Upwards Communication Options
BACnet, LON, Modbus



Modbus

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SPECIFICATIONS

Type of Control (cont...)

- device configuration	(98) remote RS-485 digital DT5 transmitters; or (48) remote RS-485 digital DT5 transmitters with (48) remote 4-20 mA analog AT transmitters, and up to (5) RS-485 relay/AO modules (total of 30 relays and 12 analog outputs per system)
Stage level / setpoint	Field adjustable over full range, five (5) per transmitter 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;
- application	Remote audio/visual alarm reset or override function
Relay outputs w/status LEDs	
- standard	Five (5) SPDT, 8 A, 24 VAC/VDC - 250 VAC, contact resistance 100 mΩ, max.
- optional, add-ons	Up to (10) SPDT, built-in "Max. possible (5) modules (30 relays) remotely or built-in"
- 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 (SP) 0-9,999 seconds
VDC output supply	24 VDC, 0.5 A fused
Analog output	Two (2) independent 4-20 mA signals, 500 Ω max. load, selectable as low, high or averaging of sensor inputs, per relay/AO module
Audible alarm	85 db (10 ft), enabled or disabled, selectable; assignable to stage level S1, S2, S3, S4 or S5
Alarm acknowledgment	Menu-driven and system reset function for latched relays

User Interface

Keypad type	Refer to "User Interface & Controller"
Touch buttons	Six (6)
Status LED's	Red: Setpoint 2 exceeded Orange: Setpoint 1 exceeded Yellow: Fault (fail)
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	Read status information via BACnet coupler and BACnet-Profile, BACnet-Services and BACnet BIBBs
Communication	C5-BAC-98 (B1) or C5-BAC-48-48 (B2)
Sensor values	TCP/IP 10/100 Mb/s/sec
Connector	All 0-250 ppm CO or 0-100%
Interface	Ethernet RJ45
Description	BACnet-Profile BACnet-Services "Who-is (execute)" "I-am (initiate)" "ReadProperty" "WriteProperty"
Object types	Version B1.2, B2.2

LON Interface, optional*

Coupler module(s) LONWORKS®	Read status information via LON coupler(s) and LON interoperable nodes to a LON network
- device category	DA, DB, NLA, NLB
- communication	Standard network variables, SNVTs according LONWORKS® application layer, interoperability directives
- LONWORKS® version	Gas concentration
- LONWORKS® object	TP/FT-10
- standard program ID	3.2
- standard networks & configuration variables	0000 - node object 0001 - open loop sensor object 0054 - open loop sensor object 49:4F:50:2D:44:00:00:00
	Refer to "Ordering Information" and "DGC5 User's Manual"

Modbus Interface, optional*

Module	Read status Information via Modbus interface and Modbus function 16 and 03
Communication	Integrated at Controller module
Interface	19200 baud
Description	1 start-bit, 8 data-bits
Addresses	1 stop-bit, no parity
- 1000 to 1098	Function 16
- 2000 to 2048	Function 03
- 3000 to 3098	
- 0 to 6	Current value internal, sensor 1-98
- 8 to 19	Current value external, sensor 1-98
	Average value internal, sensor 1-98
	Relay bits, relay 1 to 30
	Analog outputs 1 to 12

(*) BACnet and LON Interface: NRTL Certification to UL STD 61010-1 – "Pending"

SPECIFICATIONS

Data Logging, optional

Activation	Alarms, faults, values or any combination
Log rate	10 sec...2.7 hours
Capacity	4 GB, removable flash drive; approx. 18 months for all channels at 1 min. intervals

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 $\pm$ 10%

Physical

Enclosure (panel)	
- material	Polycarbonate, impact resistance EN 50102/IK08, flammability rating UL 94-5V
- 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 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 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 Perf Tested & Certified
 Conforms to STD ANSI/UL 2017
 City of Los Angeles
 CE
 VDI 2053, C-No. 418791
 EMV-Compliance 89/336/EWG
 UL Listed, E75645
 Two years material and workmanship

- enclosure (panel)

Warranty

ORDERING INFORMATION

DGC5 - A 0 2 - 1 0 00 US

C5 Upwards Communication Gateways	
00	None
B1	BACnet; for 98 DT5 Transmitters; 0–250 ppm CO (C5-BAC-98)
B2	BACnet; for 48 DT5-AT/LC Transmitters; 0–250 ppm CO (C5-BAC-48-48)
B3	BACnet; for 98 DT5 Transmitters; 0–100% (C5-BAC-98-1)
B4	BACnet; for 48 DT5-AT/LC Transmitters; 0–100% (C5-BAC-48-48-1)
B5	BACnet+Modbus; for 98 DT5 transmitters; 0-250 ppm CO (C5-BAC-98)
B6	BACnet+Modbus; for 98 DT5 transmitters; 0-100% (C5-BAC-98-1)
B7	BACnet+Modbus; for 48 DT5-AT/LC transmitters; 0-100% (C5-BAC-48-48-1)
L1	LON; for 56 DT5 Transmitters (C5-LON-DA)
L2	LON; for 98 DT5 Transmitters (2x = C5-LON-DA+DB)
L3	LON; for 28 DT5-AT Transmitters (C5-LON-NLA)
L4	LON; for 48 DT5-AT Transmitters (2x = C5-LON-NLA+NLB)
M1	Modbus; for DT5 or DT5-AT Transmitters (Integrated at Controller module)

EP5-05 Relay/AO Expansion Modules	
0	None
1	(5) Relays / (2) 4-20 mA (1x EP5-05)
2	(10) Relays / (4) 4-20 mA (2x EP5-05)

RS-485 Serial Port/Trunk Connections	
1	1 Port/Trunk Module (1x CON5-A)
2	2 Port/Trunk Modules (2x CON5-A)
3	3 Port/Trunk Modules (3x CON5-A)
4	4 Port/Trunk Modules (4x CON5-A)
5	5 Port/Trunk Modules (5x CON5-A)
6	6 Port/Trunk Modules (6x CON5-A)
7	7 Port/Trunk Modules (7x CON5-A)
8	8 Port/Trunk Modules (8x CON5-A)

RS-485 GC5 Controller	
1	98 DT Transmitters (GC5-98)
2	48 DT-AT Transmitters (GC5-48-48)
3	98 DT Transmitters (w/ data logging)
4	48 DT-AT Transmitters (w/ data logging)

Enclosure Options	
0	None
1	Keylock with 2 Keys (ENCL-A)
2	Keylock with 2 Keys (ENCL-B)
3	Keylock with 2 Keys (ENCL-C)

Enclosure Type	
A	1 DIN Rail / 1 Window (DGC5-Encl-A) "Small"
B	2 DIN Rails / 2 Windows (DGC5-Encl-B) "Medium"
C	3 DIN Rails / 3 Windows (DGC5-Encl-C) "Large"

Maximum Controller Options		
	Large Modules*	Small Modules**
Encl. "A"	0	4
Encl. "B"	0	10
	1	8
	2	4
Encl. "C"	2	10
	3	7
	4	4

* EP5-05, L1 & L3 = 1. L2 & L4 = 2

** CON5-A, B1, B2, B3, B4

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 Relay/AO Expansion Modules
 - * (1), possibly (2) C5-... BACnet or LON 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 Relay/AO Expansion Modules
 - * (1), possibly (2) C5-... BACnet or LON Couplers
- Example of max space available for controller, modules and couplers:*
 (1) GC5-98 + (4) CON5-A + (2) EP5-05 + (2) C5-...



Enclosure “Type A”

 Enclosure “Type B”,
 See page 1


Enclosure “Type C”

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

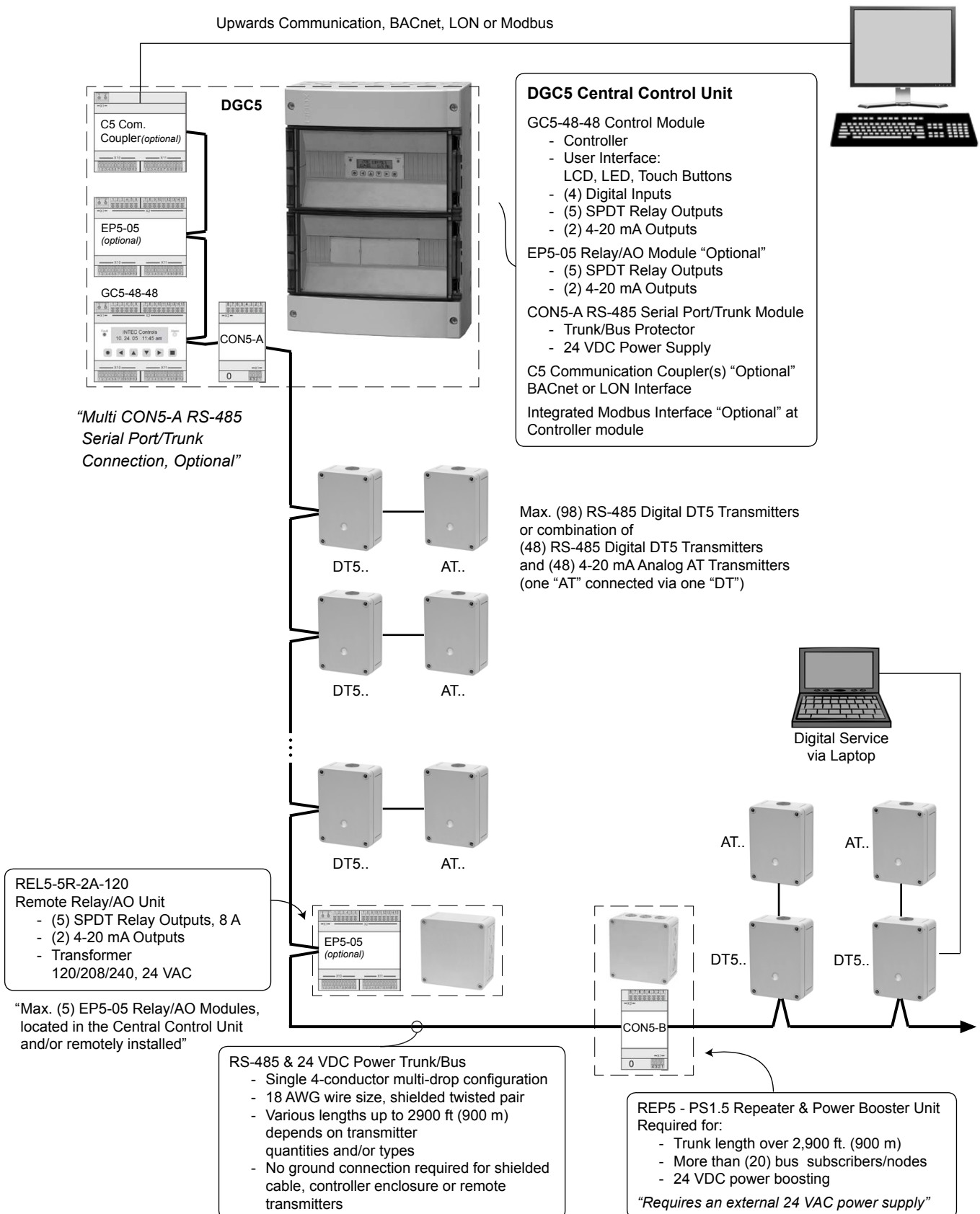
- C5-LON-NLB LON Coupler:**
- > (20) SNVTs for DT5 transmitters (29.1-48.1)
 - > (20) SNVTs for AT transmitters (29.2-48.2)
 - > (6) SNVTs for (30) digital relay status bits
 - > (12) SNVTs for (12) analog values with minimum/average/maximum function

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.

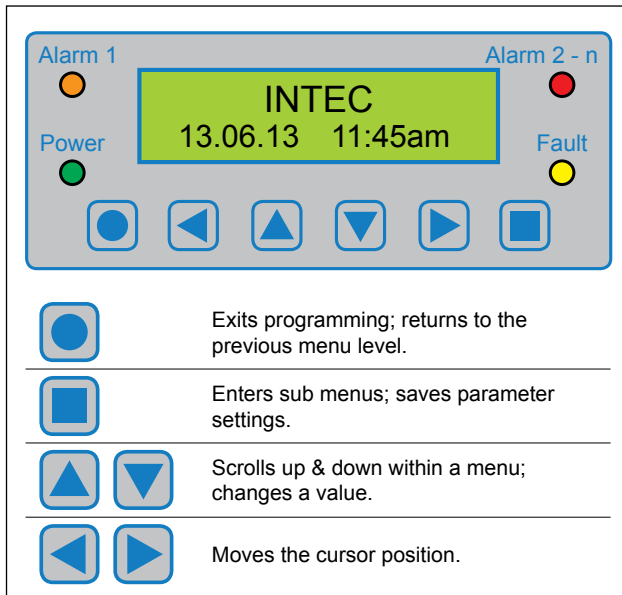
PolyGard DGC5 Multi-Point RS-485 Digital Gas Detection and Control System

Upwards Communication, BACnet, LON or Modbus

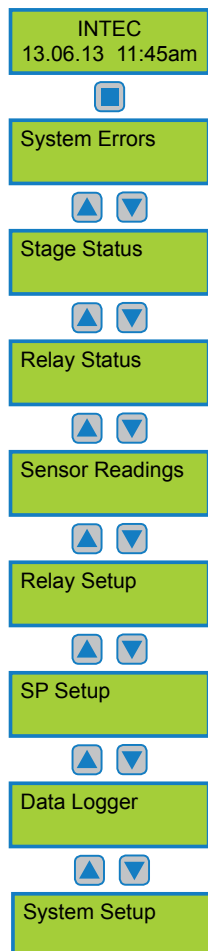


USER INTERFACE & CONTROLLER

Keypad User Interface



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 (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

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

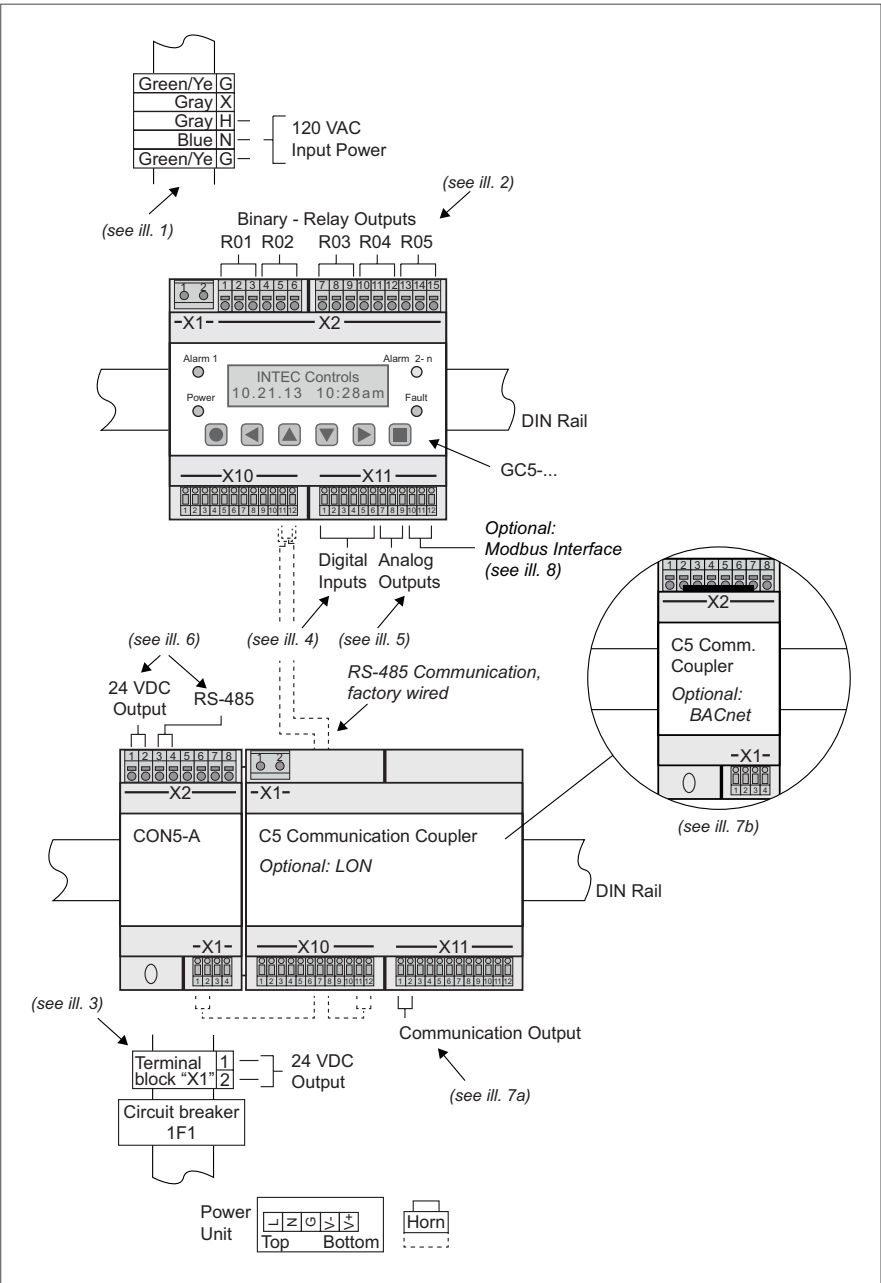
- Set data logger ON/OFF
- Set sensor data logging ON/OFF
- Set sensor data logging interval
- Set alarm ("stage status") logging ON/OFF
- Set system error logging ON/OFF

Sub Menu "System Setup"

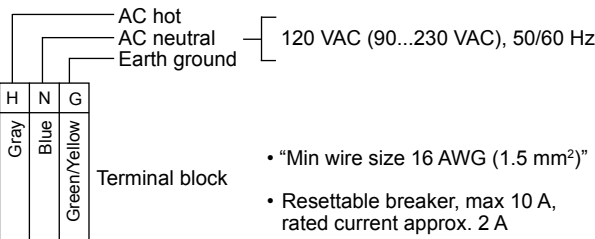
Enter and/or change system parameters.

- 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



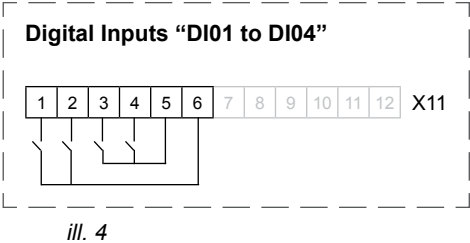
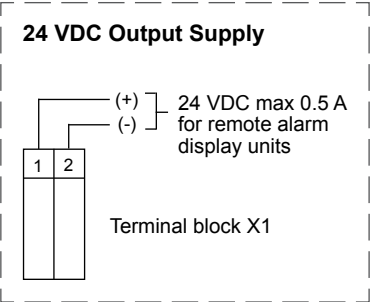
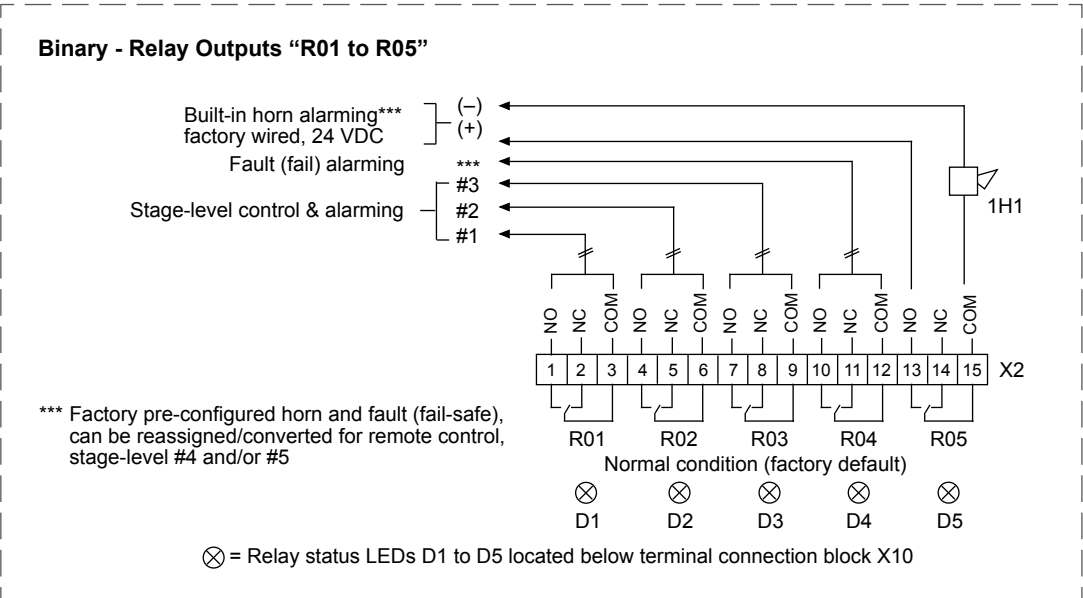
120 VAC Input Power Supply



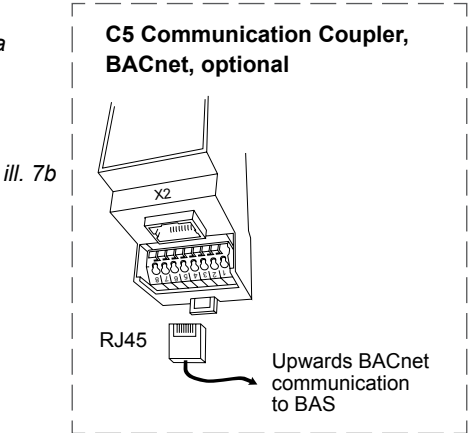
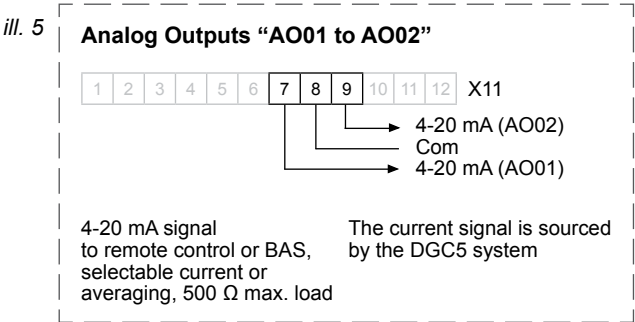
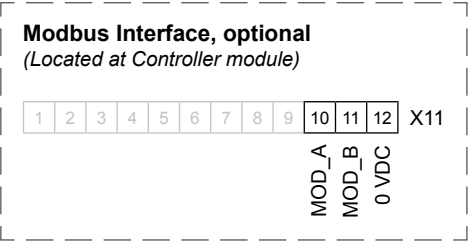
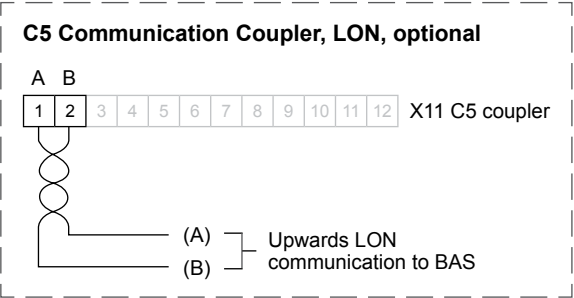
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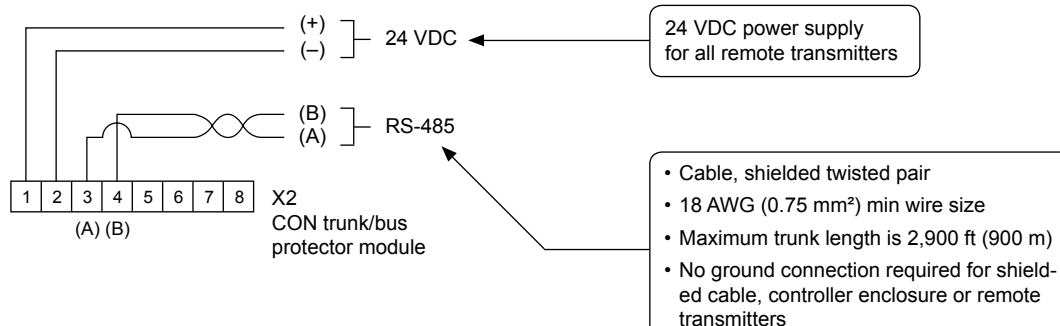


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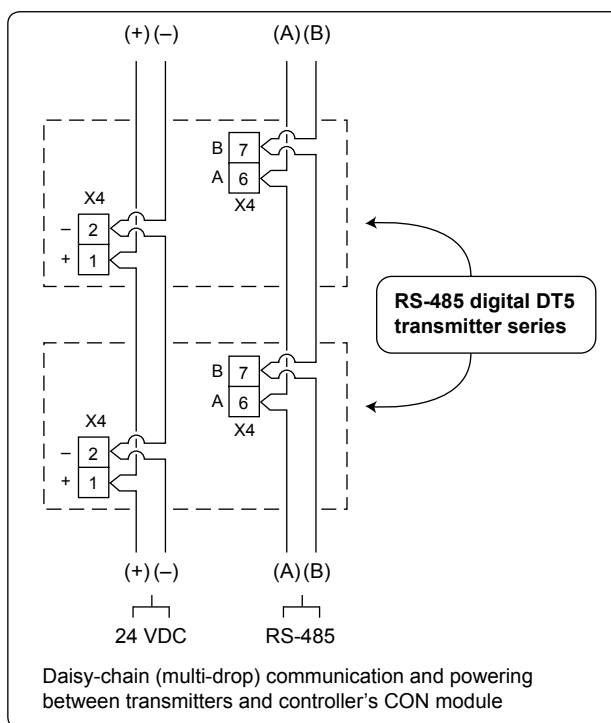
RS-485 Communication and 24 VDC Power Output Port Connections



A maximum of (98) remote RS-485 DT5 series transmitters, or a combination of (48) remote RS-485 DT5 and (48) remote 4-20 mA analog transmitters, connected one-to-one to the RS-485 DT5 transmitters, can be daisy-chained via the communication link (port).

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.



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