

Multi-Point Digital Gas Detection and Control System

Specifications subject to change without notice. | USA 200131 | 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 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 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

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PolyGuard
DGC5



Enclosure "Type B"



City of Los Angeles Approved



NRTL Tested & Certified
 Conforms to STD
UL 2017

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

Upwards Communication Options:
 BACnet, Modbus



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 Mbits/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

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	Current value internal, sensor 1-98
- 0 to 6	Current value external, sensor 1-98
- 8 to 19	Average value internal, sensor 1-98
	Relay bits, relay 1 to 30
	Analog outputs 1 to 12

(*) BACnet 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

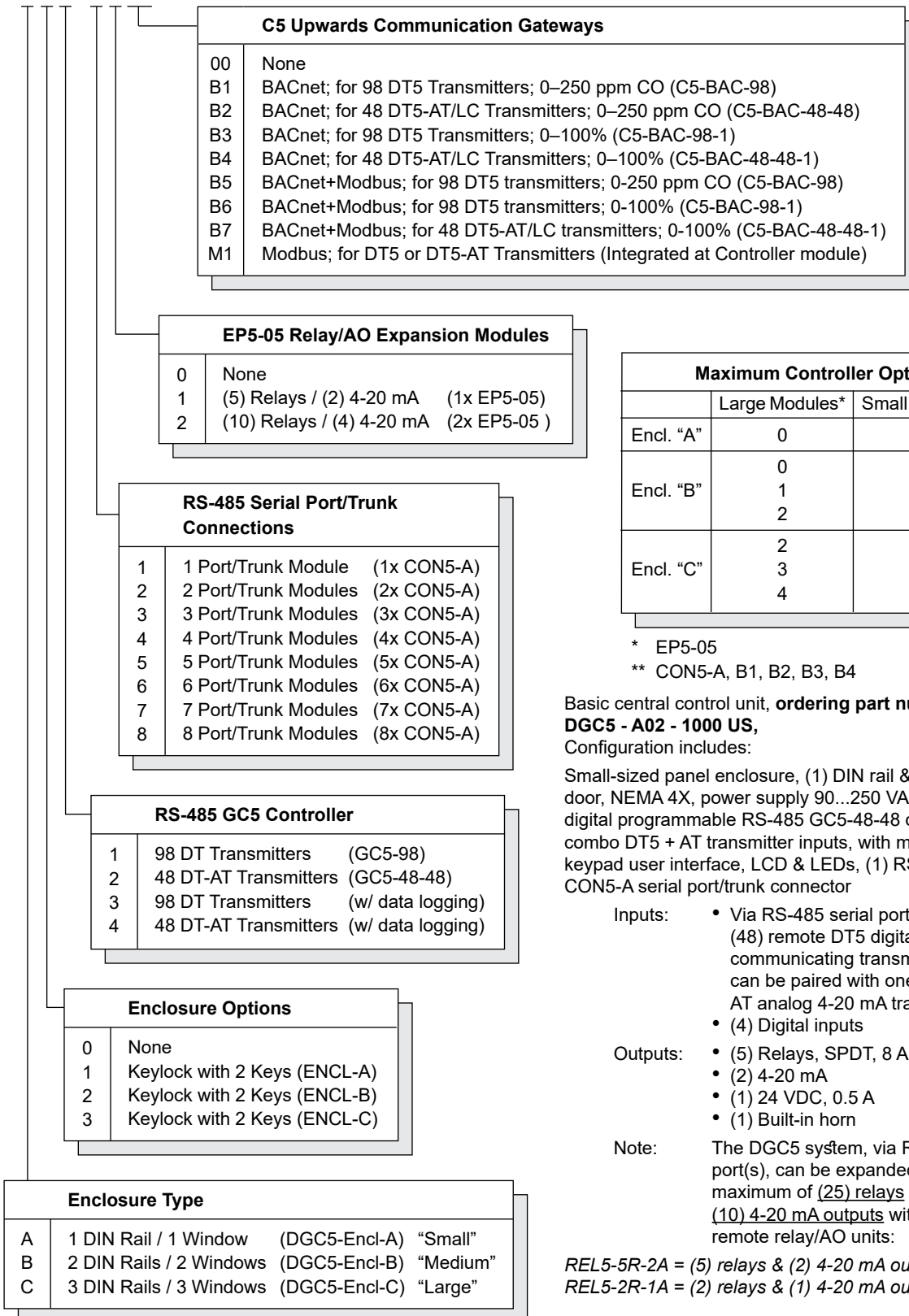
Enclosure (panel)	
- material	Polycarbonate, impact resistance EN 50102/IK08, flammability rating UL 94-5V
- conformity	UL Type 1, UL508/UL 50 standards
- color	Light gray, smoked gray for cover
- protection	NEMA 4X (IP65)
- installation	Wall (surface) mounted
Cable entry	10 holes for 1/2 in. conduit, 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 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)

Approvals / Listings

- unit rating	NRTL Perf. Tested & Certified Conforms to STD ANSI/UL 2017 City of Los Angeles CE VDI 2053, C-No. 418791 EMC-Compliance 89/336/EWG UL Listed, E75645
- enclosure (panel)	
Warranty	Two years material and workmanship

ORDERING INFORMATION

DGC5 - A 0 2 - 1 0 00 US



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

* EP5-05
 ** 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 Coupler

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 Coupler

Example of max space available for controller, modules and couplers:

(1) GC5-98 + (4) CON5-A + (2) EP5-05 + (2) C5-...



Enclosure “Type A”

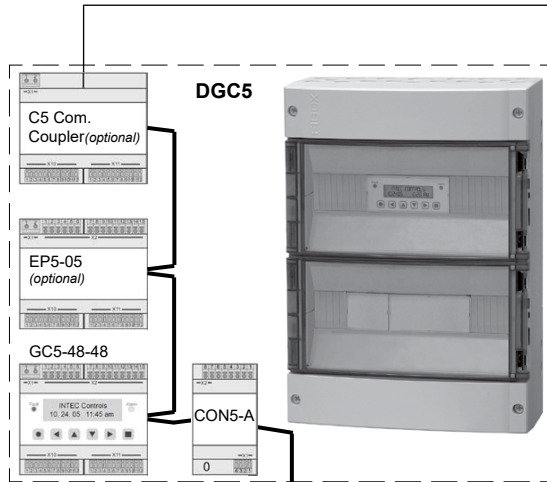
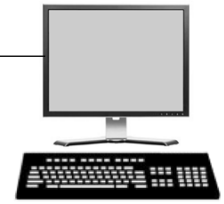
*Enclosure “Type B”,
See page 1*



Enclosure “Type C”

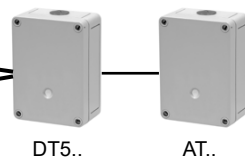
PolyGard DGC5 Multi-Point RS-485 Digital Gas Detection and Control System

Upwards Communication, BACnet or Modbus



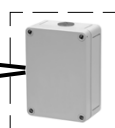
- DGC5 Central Control Unit**
- GC5-48-48 Control Module
 - Controller
 - User Interface: LCD, LED, Touch Buttons
 - (4) Digital Inputs
 - (5) SPDT Relay Outputs
 - (2) 4-20 mA Outputs
 - EP5-05 Relay/AO Module "Optional"
 - (5) SPDT Relay Outputs
 - (2) 4-20 mA Outputs
 - CON5-A RS-485 Serial Port/Trunk Module
 - Trunk/Bus Protector
 - 24 VDC Power Supply
 - C5 Communication Coupler(s) "Optional"
 - BACnet Interface
 - Integrated Modbus Interface "Optional" at Controller module

"Multi CON5-A RS-485 Serial Port/Trunk Connection, Optional"

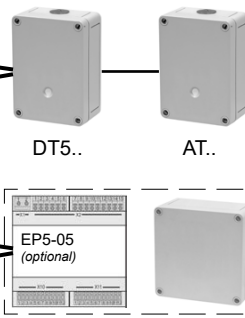


Max. (98) RS-485 Digital DT5 Transmitters or combination of (48) RS-485 Digital DT5 Transmitters and (48) 4-20 mA Analog AT Transmitters (one "AT" connected via one "DT")

- REL5-2R-1A Remote Relay/AO Unit**
- (2) SPDT Relay Outputs, 0.5 A
 - (1) 4-20 mA Output



- 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

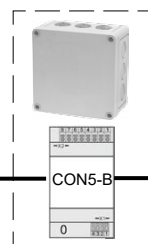
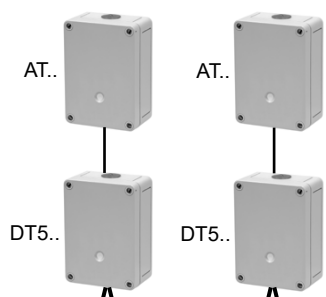


"Max. (5) EP5-05 Relay/AO Modules, located in the Central Control Unit and/or remotely installed"

- 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



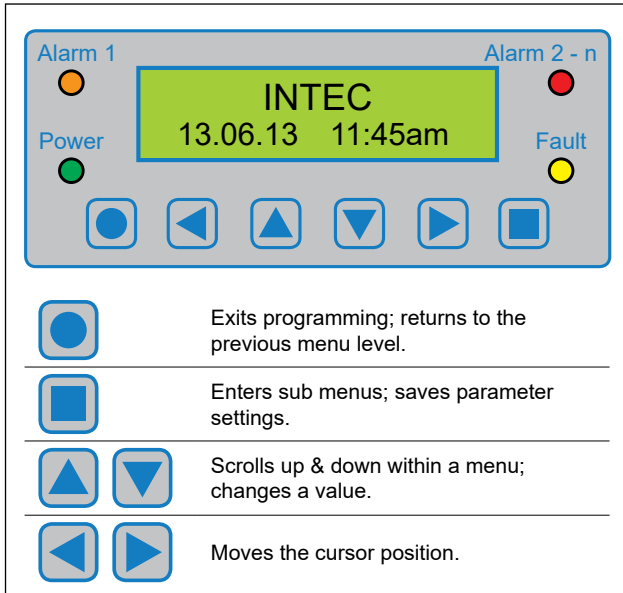
Digital Service via Laptop



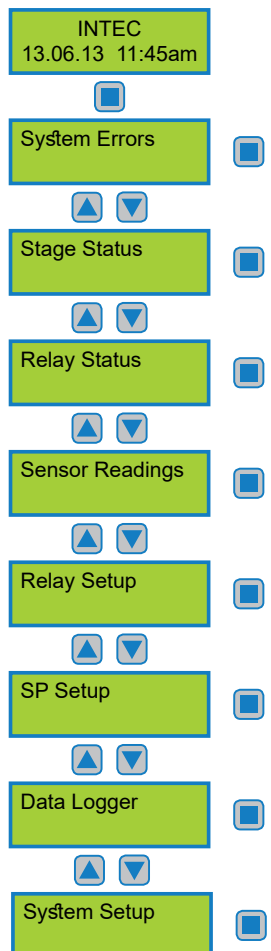
- REP5-PS24 Repeater Module**
- Required for:
- Trunk length over 2,900 ft. (900 m)
 - More than (20) bus subscribers/nodes
 - 24 VDC power boosting
- "Requires an external 24 VAC power supply"

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"

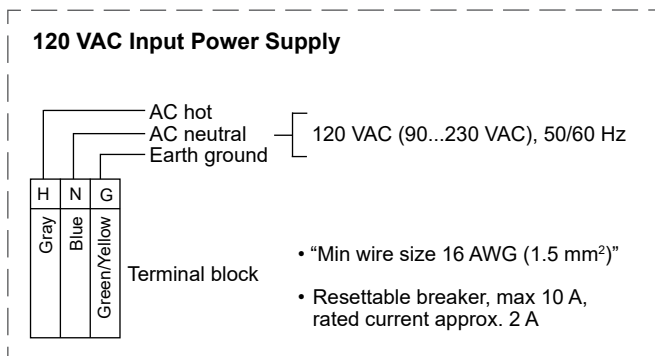
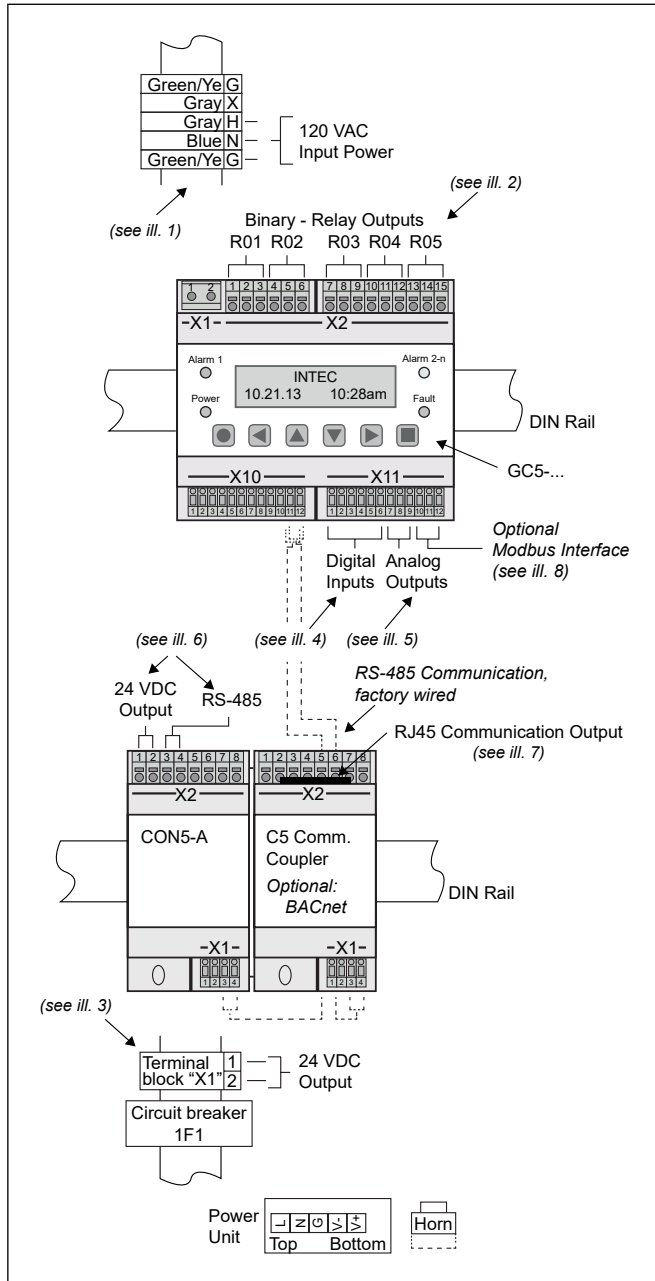
- Set data logger ON/OFF
- Set sensor data logging ON/OFF
- Set sensor data logging interval
- Set alarm ("stage status") logging ON/OFF
- Set system error logging ON/OFF

Sub Menu "System Setup"

Enter and/or change system parameters.

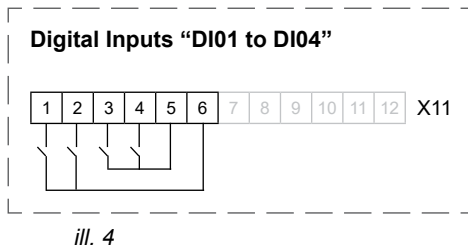
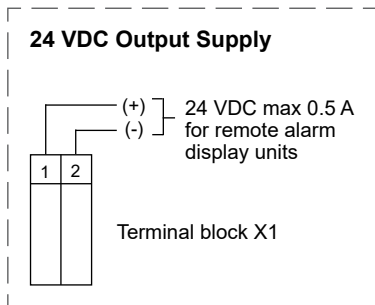
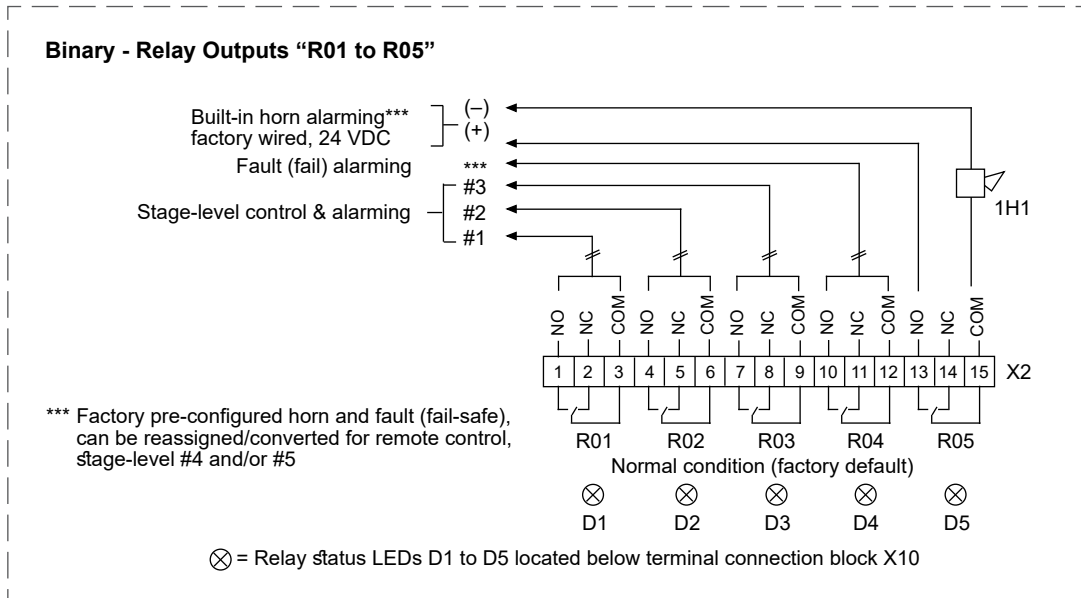
- Select service mode ON/OFF
- Set next maintenance date
- Select service phone number
- Select averaging function, time and overlay, of any SP
- Set date, time and time format
- Change customer password
- Select analog output function
- Set failure relay
- Select power ON time (alarm suppression)
- Select appropriate hardware configuration
- Assign relay multiplication

FIELD WIRING CONFIGURATION

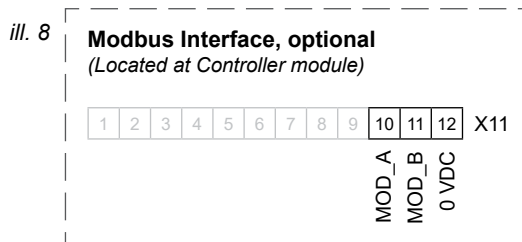
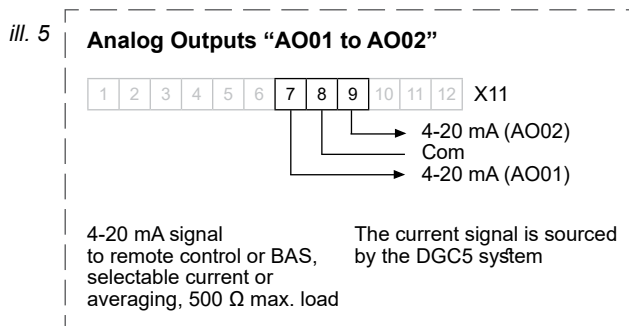
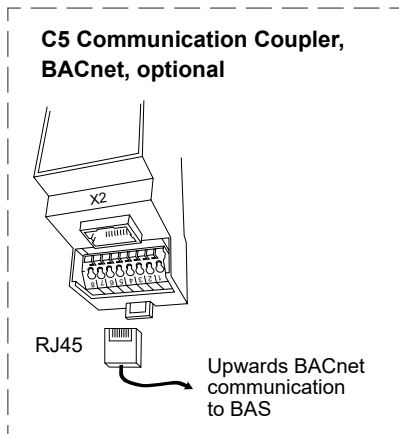


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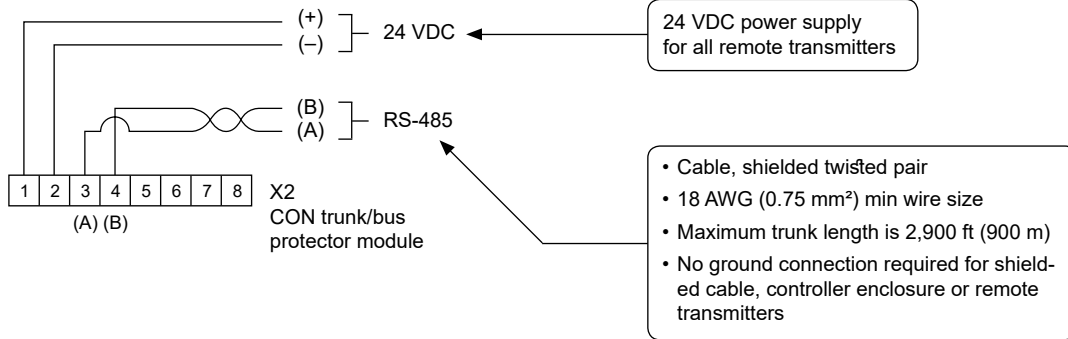


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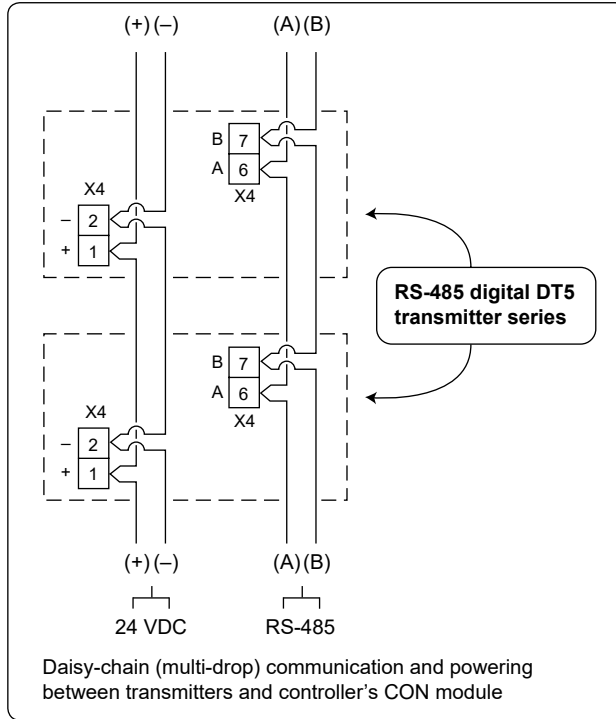
RS-485 Communication and 24 VDC Power Output Port Connections



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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