Four-Point Digital Gas Detection and Control System

IQ4-CONTROL

DESCRIPTION

Wall-mounted, microprocessor-based, four-point, digital RS-485 communicating gas detection and control system.

APPLICATION

To control and alarm upon the presence of any toxic, combustible or refrigerant gases. Any combination of the RS-485 communicating ITS, IIR series transmitters, and IM switches can be connected to the control unit. An optional RS-485 board provides upwards communication to higher level IM controller. The controller can interface via optional binary outputs, and a 4-20 mA/2-10VDC signal with any compatible electronic analog control, DDC/PLC control or automation sysem.

FEATURES

- *Continous monitoring*
- *RS-485 digital bus, serial communication*
- *Up to (4) remote RS-485 communicating transmitter & switch inputs*
- *Optional, (4) binary/relay outputs*
- *Optional, (1) analog output, 4-20 mA or 2-10 VDC, selectable*
- *(3) 24 VDC outputs for remote alarm displays or relays*
- *Optional, RS-485 upwards communication to IM controller*
- *RS-232, programming port*
- *Accept combination of toxic, combustible gases, or refrigerant sensor inputs*
- *Liquid Crystal Display (LCD)*
- *LED status indicators*
- *Keypad user interface*
- *Manual system power switch*
- *Easy programming via PC or laptop computer or keypad*
- *NEMA 4X enclosure*
- *2-year warranty*

NRTL/C
"Pending"

SPECIFICATIONS

Electric	
Power supply	24 VAC (15-24 VAC), floating, 50/60 Hz, 24 VDC (18-30 VDC)
Protection	(2) Fuses, 4.0 A and 1.0 A
Power consumption	
- standard unit w/o remote transmitters	2.4 VA (100 mA)
w/optional features, add-on consumption	
- (4) SPDT relays	4.8 VA (200 mA)
- Isolated 4-20 mA or 2-10 VDC output	1.2 VA (50 mA)
- RS-485 upwards communication	2.4 VA (100 mA)
Type of Control	
General	Six-stage control, assignable up to four (4) binary/relay*, one (1) pair of 24 VDC and (1) 24 VDC switched ouputs, i.e. low-med-high-fault, and two-stage for remote alarm units, or any other combinations *"*With optional relay card"*
Digital input/output, serial communications	(1) Parallel port RS-485 w/OptoMux protocol, single 4-conductor multi-drop configuration link
- device configuration	Up to (4) remote transmitters and / or switches *"Use twisted, balanced, shielded pair RS-485 cable with an impedance of 120 Ω e.g. Belden 9841"*
Stage level / setpoint	Field adjustable over full range via keypad user interface or through supplied software installed on a remote laptop computer
- hysteresis/ switching differential	Selectable for each sensor point
Optional relay outputs (RLY1 to RLY4)	(4) SPDT, 250 VAC / 10 (7.5) A - 30 VDC / 10 (5.0) A

SPECIFICATIONS

Type of Control (cont…)

Relay assignment and configuration	Independent, individually set to one or all remote transmitters; Fail assignment for all transmitter inputs Normally/not-normally energized and latching
- time delay switching	Individually set, make, break, average, and voting, 0 to 60 minutes
VDC switched ouptuts (TB1, TB2, TB3)	Three (3) 24 VDC, 300 mA, max. per one output, maximum 700 mA for all outputs
- TB1 and TB3	Tandem output, TB1 automatically activates TB3
- TB2	Stand-alone output
- stage level/setpoint and configuration	Independent, individually set to one or all remote transmitters, and to any setpoint Output 24 VDC assignable as continuous, double-tap intermittent or intermittent 50% duty cycle signal "*Only for TB1; not for TB2 or TB3"*
Alarm acknowledgement	Menu-driven and system reset function for latched relays

User Interface

Keypad type	Refer to "illustration keypad user interface"
Touch buttons	Four (4), audible
Status indicators	(4) Red LEDs, for status of relays (1 to 4) (4) Green LEDs, for RS-485 communications status
Digital display	Liquid Crystal Display (LCD), two lines, 2x8 characters, with backlight
- scroll rate	Adjustable, 1-9 sec.
- displays	Transmitter address, gas type, concentration and alarm status

Programming

Down & uploading large data bases	RS-232 port w/RJ-11connector
Data base configuration	Refer to "IM-View Controller, Software" section

Environmental

Permissible ambient	
- working temperature	-4° to 122°F (-20°C to 50°C)
- storage temperature	-40°F to 158°F (-40°C to 70°C)
- humidity, continuous	5 to 95% RH, non-condensing, at 77°F (25°C)

Physical

Enclosure	
- material	Polycarbonate, impact-resistant, fire-retardant, flammability rating UL 94-5V
- color	Cool gray, front gray/black
- protection	NEMA 4X (IP66)
- installation	Wall (surface) mounted
Dimensions (H x W x D)	4.73 x 7.09 x 3.54 in. (120 x 180 x 90 mm)
Cable entry	1 hole for 1/2 in. conduit, covered
Wire connection	Terminal blocks, screwed type for lead wire
Wire size	Min. 24 AWG (0.25 mm²), Max. 14 AWG (2.5 mm²)
Weight	
- standard	1.4 lbs (0.64 kg)
- w/all options	1.9 lbs (0.90 kg)
Approvals / Listings	
- relays (RLY1 to RLY4)	UL Recognized, CSA Certified, VDE
- enclosure	UL Listed E65324
- unit	CSA C/USA/NRTL (pending)
Warranty	24 months material and workmanship

OPTIONS

Relay Output Board "R"

Board w/standard terminal blocks for wiring connection	(4) relays, SPDT 250 VAC / 10(7.5)A - 30 VDC / 10(5.0) A

Analog Output Board "T"

Board w/ standard terminal blocks for wiring connection	(1) Signal ouptut, isolated floating , 4-20 mA; max. impedance 600 Ω, or 2-10 VDC, min. impedance 20 kΩ, jumper selectable
Signal assignable	To single or multiple sensor inputs, scalable for single, average or high values
Power provided	Internally from controller

RS-485 Upwards Communication Board "4"

w/ standard terminal blocks for wiring connection	(1) Paralled port RS-485 w/ OptoMux protocol for serial communication via the transmitter trunk/bus to the IM controller

Note: *"Maximum of two (2) option cards can be applied to the controller."*

ORDERING INFORMATION

IQ4C-R00

Options	
000	Basic controller
R00	w/ Relay card, (4) SPDT, 10A
0T0	w/Analog output card, (1) 4-20 mA / 2-10 VDC
004	w/RS-485 Upwards communication card

Note: "Maximum of two (2) option cards can be configured"

Control system, ordering part number:

IQ4C-R00
configuration includes:

Digital, software programmable, RS-485 network controller with keypad user interface, LCD & LEDs, 24 VAC/VDC, 50/60 Hz, NEMA 4X enclosure

Inputs:
- Via the (1) RS-485 port
- up to (4) remote RS-485 communicating transmitters and/or switches
- RS-232 programming port

Outputs:
- (4) Relays, SPDT, 10 A,
- (3) Switched 24 VDC, 0.3 A

CONTROL TRANSFORMER SIZING

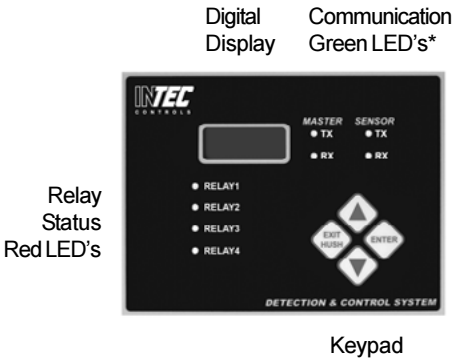
Hardware	Rating, each
• IQ4C-000 Basic controller	2.4 VA
• xxxx-R00 Optional relay card	4.8 VA
• xxxx-0T0 Optional analog output card	1.2 VA
• xxxx-004 Optional RS-485 upwards communication card	2.4 VA
• IIR-F-R IF refrigerant remote transmitter	24.0 VA
• IM-SWITCH Remote push-button switch station	6.0 VA
• Combo IM / IR-SWITCH Remote push-button switch stations	7.2 VA
• ITS-M5160-NET CO remote digital transmitter	2 VA
• Other remote transmitters	2.5 VA
• External strobe light	7 VA
• External horn	7 VA

"Add 20 to 25% safety margins to the total net VA requirement for selecting appropriate control transformer's VA rating."

Note: Maximum 150 VA / 24 VAC power input to the controller is allowable.

USER INTERFACE & CONTROLLER

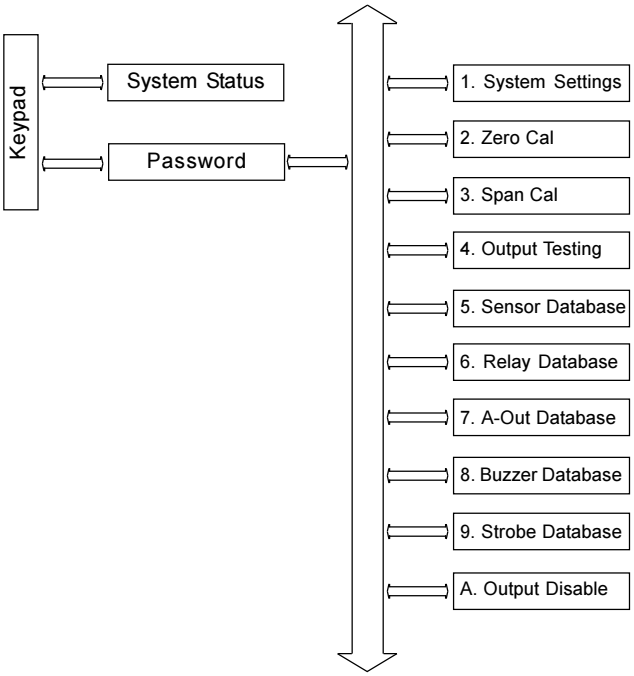
Keypad User Interface



Keypad

* RS-485 communication traffic status LED's
Master: Between IQ4 and IM controller
Sensor: Between IQ4 controller and remote transmitters/switches

Keypad Menu Tree



System Operation
Programming can be made via the keypad user interface in combination with the display screen. Security is provided via a four-digit password.

Main Page Display
Displays current sensor reading and output

Main Menu
Displays headings of "1_System Setting," "2_Zero Cal," "3_Span Cal," "4_Output Testing," "5_Sensor Database," "6_Relay Database," "7_A-Out Database," "8_Buzzer Database," "9_Strobe Database," and "A_Output."

Sub Menu "1_System Setting"
Enter and/or change system parameters
- Address (003)
- Baudrate (4800 bps)
- Scroll (3 sec)
- Backlite (ON)
- 4mA Cal (144)
- 20mA Cal (905)
- Change Password
- Link M-View

Sub Menu "2_Zero Cal"
Controller provides Remote Zeroing for smart sensors

Sub Menu "3_Span Cal"
Controller provides Remote Spanning for smart sensors

Sub Menu "4_Output Testing"
Force relay, buzzer abd strobe actions
- Relay Test
- Buzzer Test
- Horn Test
- Strobe Test
- A-Out Test

Sub Menu "5_Sensor Database"
Assign a sensor to any of the output devices (relays, buzzers, etc.)

Sub Menu "6_Relay Database"
Assign sensors to relays and configure relay functionality
- 1. Assign Sensor
- 2. Work Style
    - Assign (de-energized or energized) normal operation
    - Assign with latching or non-latching
    - Assign Average mode or Voting mode
    - Assign DELAY ON/OFF Time (in minutes)

Sub Menu "7_A-Out Database"
Assign one or more sensor input to the output channels and Configure output channels functionality
- 1. Assign Sensor
- 2. Work Style
    - Assign Concentration at 4 mA
    - Assign Concentration at 20 mA
    - Assign Average mode or Peak mode

Sub Menu "8_Buzzer Database"
Assign one or more sensor buzzers and configure buzzer functionality.
- 1. Assign Sensor
- 2. Work Style
    - Assign Average Mode or Voting Mode
    - Assign DELAY ON/OFF Time (in minutes)

Sub Menu "9_Strobe Buzzer Database"
Assign one or more sensor buzzers and configure buzzer functionality.
- 1. Assign Sensor
- 2. Work Style
    - Assign Average Mode or Voting Mode
    - Assign DELAY ON/OFF Time (in minutes)

Sub Menu "A_Output"
All outputs can be disabled/enabled for test and calibration

USER INTERFACE (cont...)

IM-VIEW Controller Software

IM-VIEW software supplied on a CD – to be used for programming and generating the controller data base.

The IM-VIEW CD kit includes a cable with serial connector and RJ-11 jack, which can be use to establish a link between the IQ4 controller's RS-232 programming port and a PC or laptop.

All database programming and configuration is possible through the front panel keypad. However, this is practical only for short programs and minor modifications.

Refer to the IQ4-CONTROL user's manual for detailed operation guidelines and database configuration parameters.

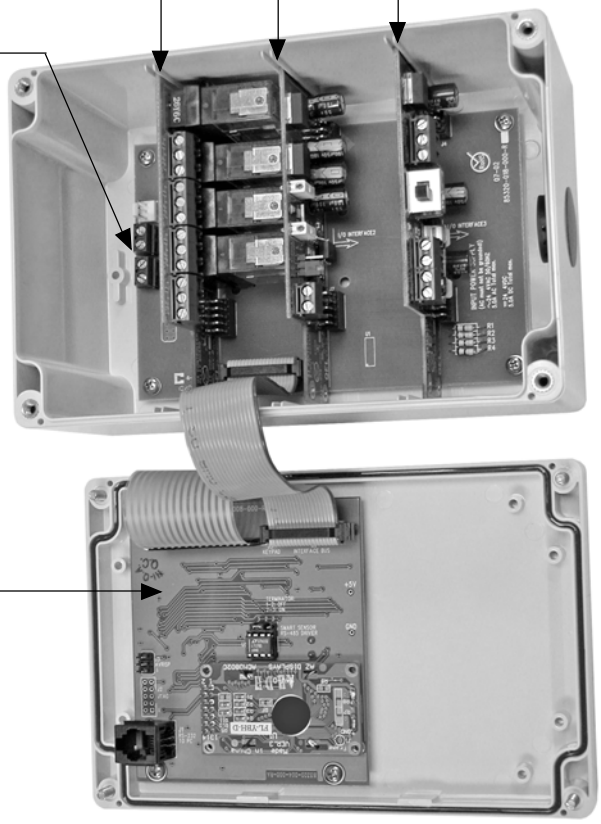
FIELD WIRING CONFIGURATION

See ill. 1 Power Supply and RS-485 Digital Communication Board

See ill. 2 Optional 4-20 mA/2-10 VDC Analog Output Board

See ill. 3 Optional Relay Output Board

See ill. 4 Buzzer, Strobe & Horn Ouputs/Motherboard



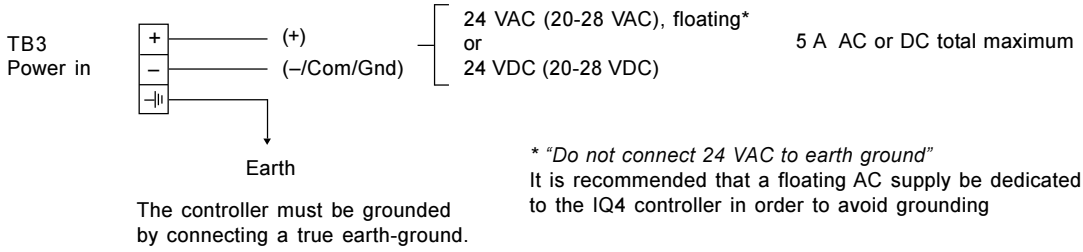
See ill. 5 Main Board

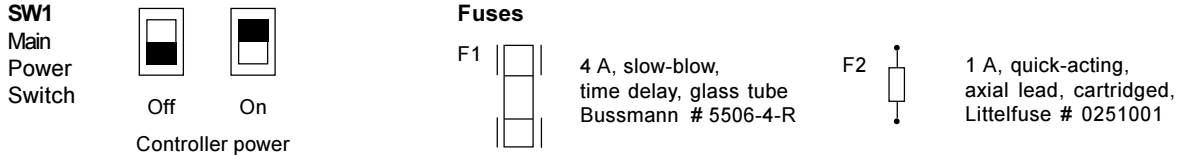
See ill. 6 Optional RS-485 Upwards Digital Communication Board → "Not shown above"

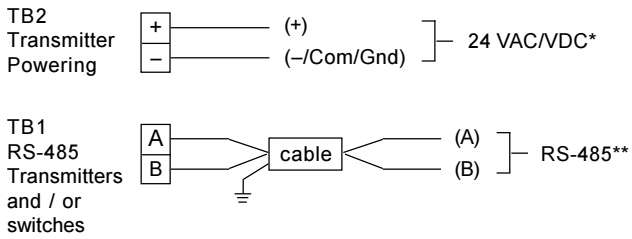
"Though three boards are available, the IQ4 controller is limited to two boards per unit"

FIELD WIRING CONFIGURATION (cont...)

Power Supply & RS-485 Digital Communication Board



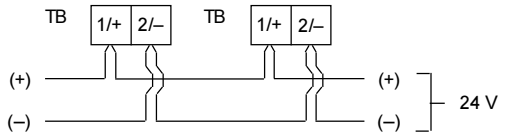




Notes:

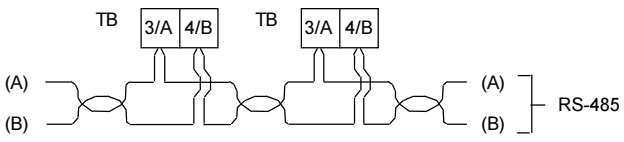
- ** The controller does not convert an AC voltage input to a DC voltage output for remote transmitters.*
  24 VAC input (TB3) 24 VAC output (TB2)
  24 VDC input (TB3) 24 VDC output (TB2)
- *** Use RS-485 cable, twisted, balanced shielded pair; with characteristic impedance of 120 Ω, e.g. Belden 9841*
- *Do not connect power to **A** and **B**; this will damage all transmitters, switches and controller linked on the same daisy-chain trunk.*
- *Daisy-chain between transmitters and controller **A** to **A**, **B** to **B**. Do not cross **A** to **B**; this creates a malfunction of communication.*
- *Daisy-chain trunk length between controller and transmitter*
  - *** RS-485 communication up to 3,000 ft. (914 m) max.*
  - ** Powering from controller, w/(4) refrigeration transmitters IIR-F-R, up to max. 200 ft. (60 m) / 18 AWG wire or up to max. 300 ft. (91 m) / 16 AWG wire*
- *Do not use high voltage lines in the same RS-485 communication cable conduit.*

Suggested daisy-chain powering
of remote transmitters



"Maximum of four (4) transmitters/switches only"

Suggested daisy-chain (multi-drop) communication
between transmitters and controller.



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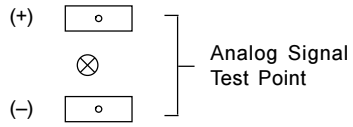
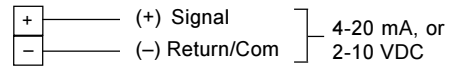
FIELD WIRING CONFIGURATION (cont...)

Optional 4-20 mA / 2-10 VDC Analog Output Board



Jumper Selector
Analog Output Signal

TB1 4-20 mA / 2-10 VDC Output Signal



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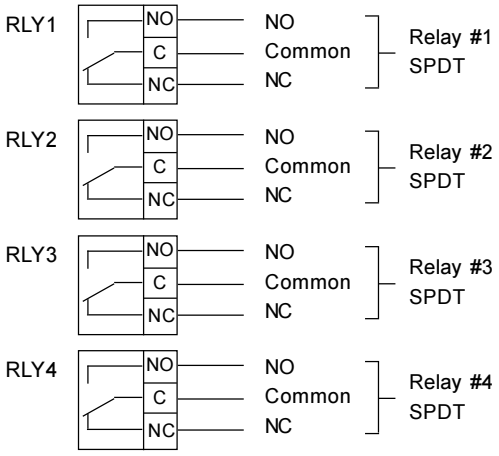
Optional Relay Output Board
250 VAC / 10 (7.5) A, or 30 VDC / 10 (5.0) A



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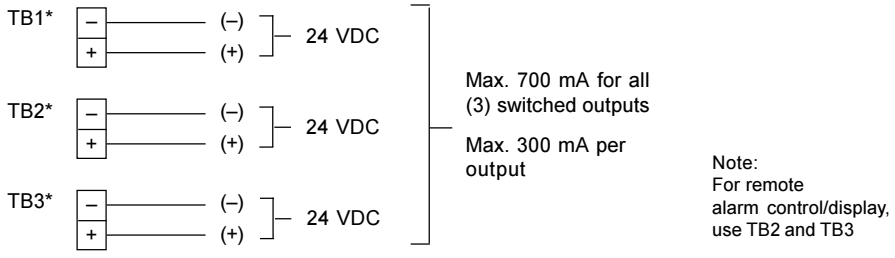
Motherboard
24 VDC outputs for remote control of
buzzer, strobe, horn and alarm display units



* Actuating of TB1 will automatically actuate TB3 (tandem function)

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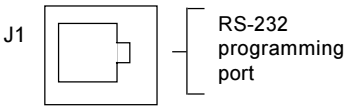
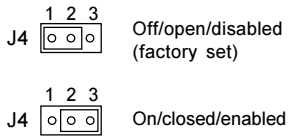
FIELD WIRING CONFIGURATION (cont...)

Main Board

J1 Computer Interface RS-232
Primarily used for loading and downloading configuration data bases.



J4 Jumper Selector, RS-485
End-of-Line Terminator



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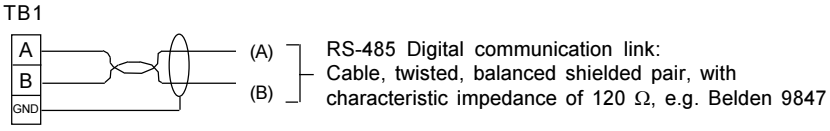
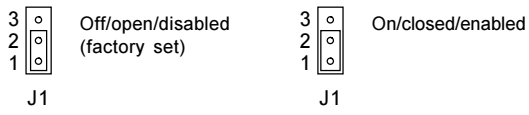
Optional RS-485 Upwards Digital Communication Board

RS-485 Upwards Digital Communication, via the transmitter trunk/bus, to the IM controller



J1 Jumper Selector, RS-485
End-of-Line Terminator



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