
Digital Signal Converter

IVA-420I User Manual

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Symbol Definitions

The following table lists the symbols used in this document to denote certain conditions:

Symbol	Definition
	ATTENTION: Identifies information that requires special consideration
	TIP: Identifies advice or hints for the user, often in terms of performing a task
	REFERENCE _ INTERNAL: Identifies an additional source of information within the bookset.
CAUTION	Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.
	CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. CAUTION: Symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death. WARNING symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.

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Introduction

Unpacking

After opening the package and removing the equipment and components, make sure that you have all the items described on the order form or packing slip.

Installation Guidelines

- Make sure to locate the monitor in an area easily accessible to a technician.
- Avoid any location where temperature changes occur rapidly.
- Verify all the requirements and existing regulations which may affect the choice of location.
- Conduit installation must conform to local fire, building and electrical codes.

Description

Available Configurations

Description

The unit can be factory set to one of three configurations. In the most standard configuration, the IVA-420I converts the transmitter digital signal to 4-20 mA analog outputs.

Although the unit is preconfigured, it is also possible to modify configurations using the unit's DIP switch (see Changing the IVA-420I Configuration section).

Available Configurations

This section provides details on the various IVA-420I configurations available as well as various wiring diagrams. The IVA-420I converter may be configured in three modes: Listening, Polling and Split Address.

Listening Mode

In this mode, the IVA-420I only listens to the information transmitted between the controller and the transmitters. It does not intervene in network operation. The converter transforms the digital signal from the transmitters into a 4-20 mA analog signal.

Once set, the converter provides a 4-20 mA analog signal for the transmitters at addresses 1 to 8 or 9 to 16 if the converter is connected to channel 1 of the 201C, and 17 to 24 or 25 to 32 if the converter is connected to channel 2.

Each converted signal is associated to a distinct output (J16 through J23).

Three statistic values are also available: Minimum, Maximum and Average, with the appropriate settings. These values are available with addresses 1 to 8, 9 to 16, or 1 to 16 if the converter is connected to channel 1 of the 201C, or 17 to 24, 25 to 32, or 17 to 32 if the converter is connected to channel 2. The outputs associated with the statistic mode are the following:

Output J20: Average

Output J18: Minimum

Output J16: Maximum

Polling Mode

In this mode, the converter polls the network. There is no 201C on the network. The IVA-420I (master) polls the transmitters (slaves) and converts the digital signal from the transmitters into a 4-20 mA analog signal.

Once set, the converter provides a 4-20 mA analog signal for the transmitters at address 1 to 8 or 9 to 16 if the converter is connected to channel 1 of the 201C, and 17 to 24 or 25 to 32 if the converter is connected to channel 2. Each converted signal is associated with a distinct output (J16 through J23).

Three statistic values are also available : Minimum, Maximum and Average, with the appropriate settings. These values are available with addresses 1 to 8, 9 to 16, or 1 to 16 if the converter is connected to channel 1 of the 201C, or 17 to 24, 25 to 32, or 17 to 32 if the converter is connected to channel 2.

Split Address Mode

(Listening or Polling)

This mode is used with a SQN8x (4 points, 2 gases). The SQN8x uses 4 points per gas. Addresses 1 to 4 are for the first gas and addresses 9 to 12 for the second gas.

On the IVA-420I, the addresses are fixed. Addresses 1 to 4 are attributed to the first 4 outputs and addresses 9 to 12 are attributed to the last 4 outputs. This configuration allows for the use of only one IVA-420I with a SQN8x with two gases.

Description

Available Configuration for 301C

Available Configuration for 301C

This function is only available with recent versions (2005 onward). When used with the 301C, it is in listening mode only; the broadcast mode must be activated on the controller side.

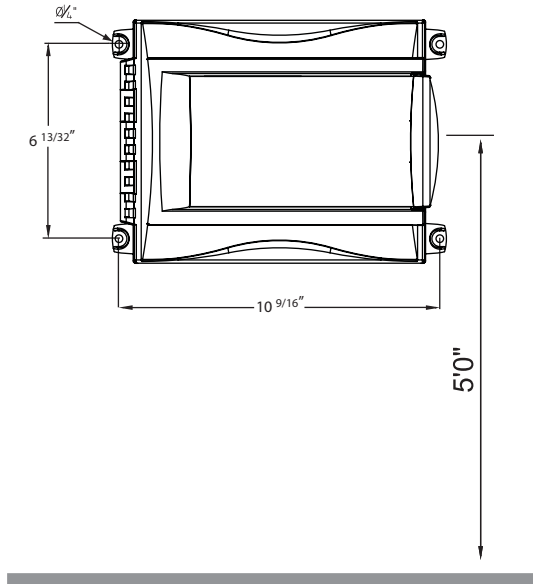
Addresses can be selected in groups of 8 (i.e. 1 - 8, 9-16 and so on until 89-96. See DIP Switch settings for further details). There are also three (3) statistic values available for selected groups: Minimum, Maximum and Average.

Each converted signal is associated to the following outputs;

Output J20: Average;
Output J18: Minimum;
Output J16: Maximum.

Installation

Installation of the converter simply requires the physical mounting of the enclosure and connection of the power and output lines.



Mounting Instructions

1. Select installation location
2. Measure and mark mounting holes (as shown)
3. Pre-drill or prepare as required by mounting surface (drywall plugs, etc.)
4. Position unit and align mounting holes with markings and install necessary screws.

Note: Remember to remove knock-outs before mounting the unit.

Wiring Details

4-20 mA Current Sourcing Output Wiring

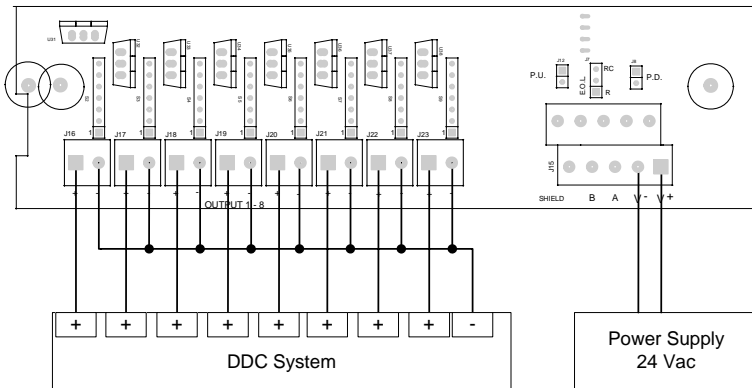
Wiring Details

4-20 mA Current Sourcing Output Wiring

The transmitter supplies the loop current. The maximum impedance supported by the loop is 400 ohms. To enable this configuration, the three jumpers must be placed on positions 1-2, 3-4 and 5-6 at distinct outputs J16 through J23.

WARNING

A dedicated power supply must be used with each unit. Considerable damage may occur if this condition is not strictly met.



4-20 mA Output Loop-powered Wiring

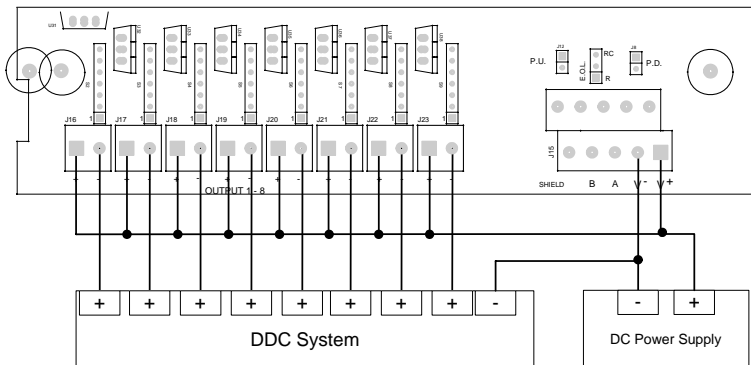
(Factory Setting)

The 4-20 mA output is factory set for loop-powered operation and requires a power source of 12 Vdc to 30 Vdc. The overall permitted impedance depends on the voltage supplied at the 4-20 mA loop. To enable this configuration, the three jumpers must be placed on positions 2-3, 4-5 and 6-7 at distinct outputs J16 through J23.

Permitted Impedance in the 4-20 mA Loop

Voltage Source Applied	Total Impedance
12 Vdc	400 Ohms
16 Vdc	600 Ohms
20 Vdc	800 Ohms
24 Vdc	1000 Ohms
30 Vdc	1300 Ohms

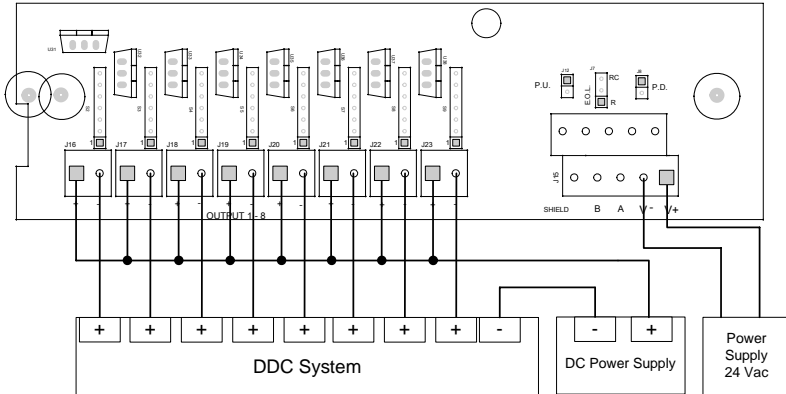
3-wire configuration



Wiring Details

4-20 mA Output Loop-powered Wiring

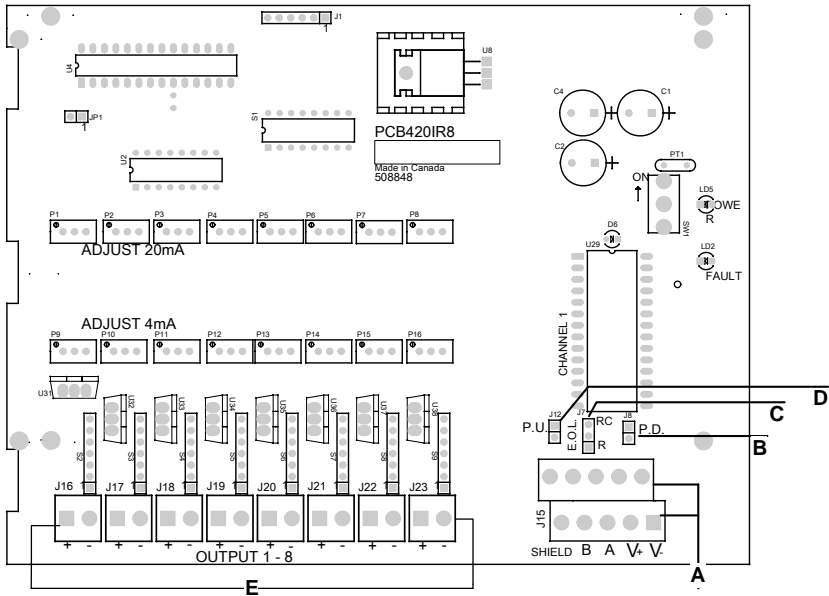
4-wire configuration



4-20 mA Output Configuration

The IVA-420I has 8 4-20 mA outputs. It converts a digital signal entering at J15 into an analog signal through outputs J16 to J23. The output signal is linear to the input. The 4 mA output represents the minimum scale from the input and the 20 mA output represents the maximum scale from the input.

PCB Terminals



- A. **Power and Communication:** J15 Input: Lower Terminal Output: Upper Terminal (for communication use 2-24 AWG twisted and shielded cable, Belden 9841 or equivalent)
- B. **J8:** Pull down resistor
- C. **J7:** 1-2, end of line resistor 2-3, end of line RC filter resistor
- D. **J12:** Pull up resistor
- E. **4-20 mA Outputs:** J16 to J23 4-20 mA outputs may be set to be Current sourcing or Loop-powered
 Current Sourcing: S2 to S9 jumpers at 1-2, 3-4 and 5-6
 Loop-Powered: S2 to S9 jumpers at 2-3, 4-5 and 6-7
 When the output reads 3.33mA, the IVA-420I does not see the corresponding transmitter.

WARNING

A dedicated power source must be used with the IVA-420I when using current sourcing as input 4-20mA configuration.

Specifications

Power requirement:	17-27 Vac, 24-38 Vdc, 500 mA
Number of outputs:	8 dedicated 4-20 mA outputs
Operating temperature range:	-20 to 50° C (-4° to 122° F)
Operating humidity range:	0% - 95% RN, non-condensing
Communication cable	2-24 AWG twisted and shielded (Belden 9841 or equivalent)
Dimensions:	8.4 in (H) x 8.6 in (W) x 2.5 in (D) (21.3 cm x 13,4 cm x 5.7 cm)
Weight:	3.5 lbs (1.58 kg) - with metal housing
Certifications	UL1244 CSA C22.2 no.205M1983(R1999)

LED Descriptions

PCB version 6 and before	PCB version 7 and up
LED 1: Power	LD5: Power
LED 4: Digital to analog signal (DAC)	LD2: Fault
LED 5: Micro-controller	D6: Communication LED

4-20 mA Output Adjustments



Before changing the S1 DIP switch settings for the 4-20 mA adjustments, note the actual setting to reset the dip switch for normal operation. After the adjustments are made, replace jumpers at S2 through S9 to the correct configuration.

The outputs must be set for current sourcing configuration. Install jumpers at positions 1-2, 3-4 and 5-6 for S2 through S9.

WARNING Do NOT use Current Sourcing Configuration if there will be voltage on the line.

Set Dipswitch S1 as follows for 4 mA adjustment:

Dip1: OFF	Dip2: OFF
Dip3: ON	Dip4: OFF

With your ampmeter at each output, adjust the 4 mA with Potentiometers P9 through P16.

Set Dipswitch S1 as follows for 20 mA adjustment:

Dip1: OFF	Dip2: ON
Dip3: ON	Dip4: OFF

With your ampmeter at each output, adjust the 20 mA with potentiometers P1 through P8.

Once completed, replace the settings to their original places.

Changing the IVA-420I Configuration DIP Switch Settings

	1	2	3	4*	5	6	7	8	Mode
VULBUS (201C)	0	0	0	0/1	0	0	0	0	Interrogation mode; Adr. 9-16
	1	0	0	0/1	0	0	0	0	Interrogation mode; Adr. 1-8
	0	1	0	0/1	0	0	0	0	Listen mode; Adr 9-16
	1	1	0	0/1	0	0	0	0	Listen mode; Adr. 1-8
	0	0	1	0	0	0	0	0	Output adjustment; 4mA
	1	0	1	0/1	0	0	0	0	Interrogation mode; split adr 1-4, 9-12
	0	1	1	0	0	0	0	0	Output adjustment: 20mA
	1	1	1	0/1	0	0	0	0	Listen mode; split adr. 1-4, 9-12
	0	0	1	1	0	0	0	0	Interrogation mode; statistic 1-16
	0	1	1	1	0	0	0	0	Listen mode; statistic 1-16
MODBUS (301C)	0	0	0	0/1	1	0	0	0	Modbus listen; Adr. 1-8
	0	0	0	0/1	0	1	0	0	Modbus listen; Adr. 9-16
	0	0	0	0/1	1	1	0	0	Modbus listen; Adr. 17-24
	0	0	0	0/1	0	0	1	0	Modbus listen; Adr. 25-32
	0	0	0	0/1	1	0	1	0	Modbus listen; Adr. 33-40
	0	0	0	0/1	0	1	1	0	Modbus listen; Adr. 41-48
	0	0	0	0/1	1	1	1	0	Modbus listen; Adr. 49-56
	0	0	0	0/1	0	0	0	1	Modbus listen; Adr. 57-64
	0	0	0	0/1	1	0	0	1	Modbus listen; Adr. 65-72
	0	0	0	0/1	0	1	0	1	Modbus listen; Adr. 73-80
	0	0	0	0/1	1	1	0	1	Modbus listen; Adr. 81-88
	0	0	0	0/1	0	0	1	1	Modbus listen; Adr. 89-96
	0	0	0	0/1	1	0	1	1	Not Available
	0	0	0	0/1	0	1	1	1	Not Available
0	0	0	0/1	1	1	1	1	Not Available	

*Note: * When DIP Switch four (4) is set to 1, it is in statistic mode (except for adjustment settings)*