Raven IS Barrier

Model 101/102/103

General Description

The Raven series of Intrinsic Safety Barriers are designed to provide a galvanically isolated intrinsically safe power and fieldbus communication to process senors in a potentially hazardous locations.

The Raven accepts a Half-duplex RS-485, RS-232 or USB serial connection and provides a intrinsically safe Half-duplex RS-485 out. No protocol conversion takes place and communication rates between 9600 to 38400 bps are supported.

Power is provided by the USB port or by the Power Input. The power input accepts power with a voltage range of 5 to 30 volts. The IS power output provides 5 volts at a maximum of 40mA current draw.

Communication Options

The Raven is essentially a fieldbus isolating repeater for the intrinsically safe operation of a RS-485 interface. Three communication inputs are provided RS-232, USB and RS-485. Two opto-couplers and a DC-DC converter provide a galvanic isolated communication connection

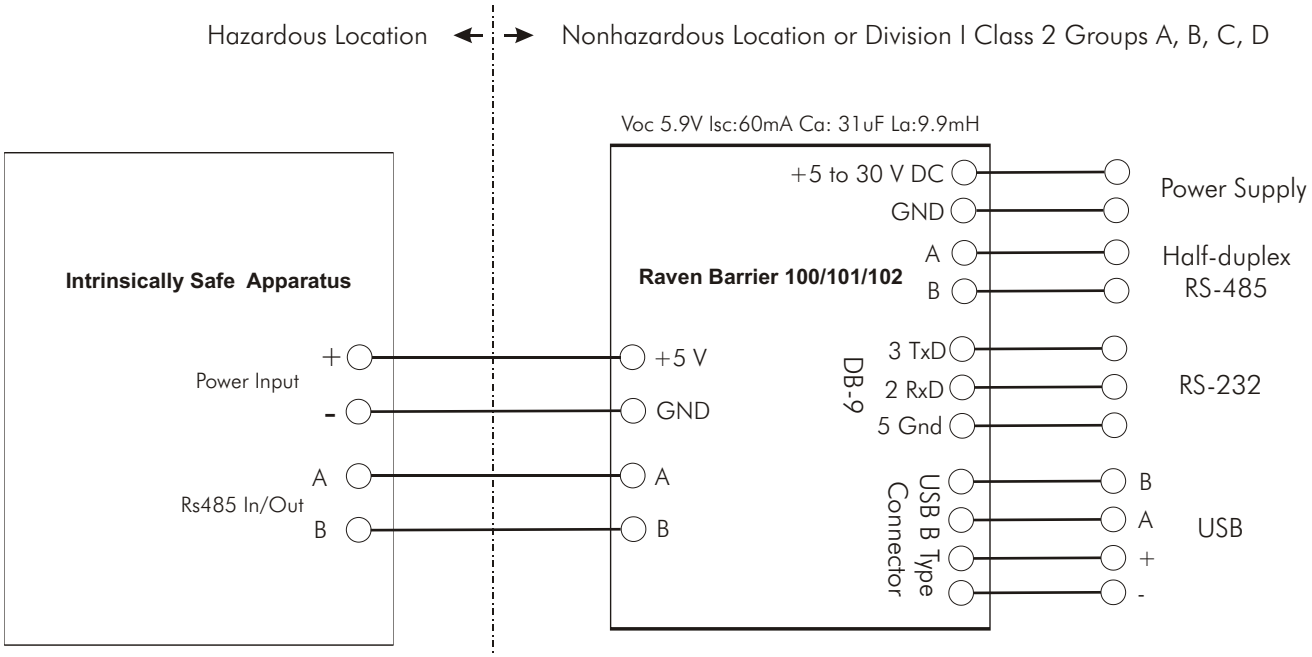
The Raven automatically switches to the active communication input. If more than one input is trying to communicate at once the data can be corrupted. Send Data Control recognizes the first bit of data from the Safe side, enables the transmitter and disables the Receiver. No handshaking lines are required.

Since the Raven is protocol independent, and simply passes the data across it can be used with any other serial based protocol, such as Modus. On version 1.81 and higher the Raven also repeats all communication to all other connections. For example, data coming in the USB port is sent to the RS-232, Div 2 RS-485 and the Div 1 RS-485.

The RS-232 connection requires a straight through cable to be attached to a RTU or PC. If your using the USB connection the FTDI drivers must be installed.

Power

The Raven requires a power connection between 4.5 volts and 30volts. Power can be supplied either



Notes:

1. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus not Specifically examined in combination as a system when the approved values of Voc and Isc for the associated apparatus are less than or equal to Vmax and Imax for the intrinsically safe apparatus and the approved values of Ca and La for the associated apparatus are greater than Ci + Ccable and Li + Lcable, respectively, for the intrinsically safe apparatus.

2. In the United States wiring methods must be in accordance with the National Electrical Code, ANSI/NFPA 70, Article 504. Additional installation information can be found in ANSI/ISA-RP 12.6.

3. In Canada all wiring shall comply with the Canadian Electrical Code Part I and Local Electrical Codes

4. Barriers shall not be connected to any device which uses or generates internally any voltage in excess Of 250V Rms AC or DC.

5. These barriers are rated "Nonincendive". If the barriers are intended to be mounted in a Division 2 location, they must be installed in an enclosure meeting the requirements of ANSI/ISA S82. The enclosure may be installed in a Class I, Division 2, Group A, B, C, or D hazardous location.

6· The Intrinsically Safe Apparatus manufacture's installation drawings must be followed when installing the Raven.

7. Connection of barriers to ground is not required.

8. Instrument modifications or parts replacement by other than authorized representatives of Cal-Scan Services is prohibited and will void UL/CSA Intrinsically Safe Certification

Control Diagram For Raven Barrier 100/101/102
Drawing# Raven-001

comes from the USB connection or the + and - pin on the Power Input/RS-485 connection on the Safe Side of the Raven. The maximum current draw is 100mA though in reality much less most of the time, the higher the input voltage the less current the Raven will draw.

There are two red led's on the Raven. Both are indicators that there is power being supplied. The one on the safe side, marked "Main Power" indicates main power is on. The one on the hazardous side, marked "Isolated Power" indicates that current is getting across the galvanic power supply for the hazardous side to use.

The Raven provides up to 40 mA of current at 5 volts to power the process sensor in a hazardous location. The power supply is Galvanically Isolated DC-DC converter so possible ground loops are eliminated during installation.

Trouble Shooting

I plug the Raven in but neither of the Red LED's glow.

Verify that there is between 4.5 and 30 volts being applied to the power input on the Raven. If you are using USB the Raven can draw its power from the USB connection.

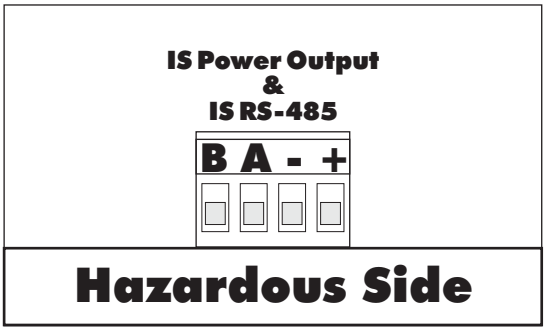
I plug the Raven in but only the "Main Power" Red LED is glowing or the "Isolated Power" LED is glowing dimly

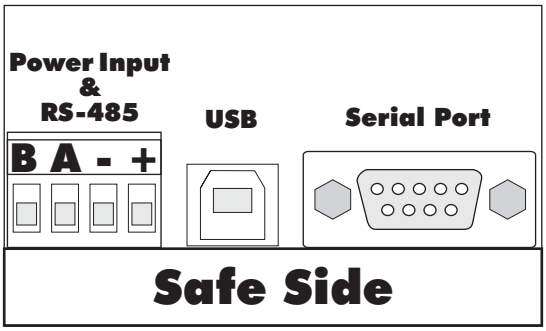
Normally the output on the isolated side is 5 volts. If there is a short the Raven will automatically reduce the voltage to limit the output current. Verify the isolated output voltage is 5 volts. If its much less than this you probably have a short. Disconnect the isolated connection and see if the Raven outputs 5 volts again, if so you have short in your wiring.

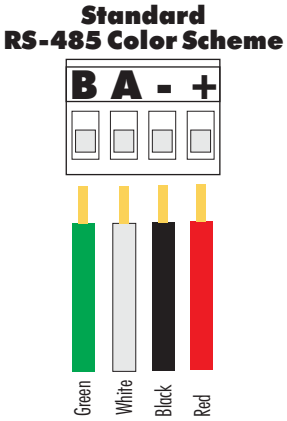
Im trying to use the RS-232 serial port but I cant get any communication.

There are two basic types of serial connections, straight-through and null modem. The Ravens serial port requires a straight though serial cable, like the one used for modems. Basically the difference is that the TX and RX wires are reversed in a null modem connection, while in a straight-through connection the TX and RX wires are the same on both ends.

I/O Port Connections







All Calscan RS-485 cables will use this industry standard wire color scheme

Specifications

Dimensions: 3.8 x 2.8 x 1.7 in
Temperature Range: -40 to +60°C
Humidity Range: 0 to 95% non-condensing
Supply Voltage: +5 to 30VDC @ 100mA
Data Rates: 9600 to 38.4 kbps
Isolation: 4000VAC Optical Isolation of Data Signals and Ground

Suitable for installation in Class I, Division 2, Groups A, B, C and D
Temperature Code T6, Maximum ambient 60°C;
Provides Intrinsically Safe outputs for Class I, Division 1, Groups A, B, C and D
Entity parameters: Voc = 5.9Vdc, Isc = 60mA, Ca = 31uF, La = 9.9mH.

Average Current Consumption

Supply Voltage	Current No load	Current 5mA Load
5 volts	28.0 mA	36.0mA
12 volts	10.5 mA	14.0mA
24 volts	5.50 mA	7.50mA
28 volts	5.00 mA	6.50mA
30 volts	4.50 mA	6.00mA

CSA INTERNATIONAL

Certificate of Compliance

Certificate: 1468207 **Master Contract:** 207045

Project: 1468207 (Edition 1) **Date Issued:** 2003-11-20

Issued to: **Cal-Scan Services Ltd.**
4188 - 93rd Street N.W.
Edmonton, AB T6E 5P5
CANADA

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US'

C US

Issued by: Andrew Redeker, C.E.T.
Certification Specialist

Authorized by: Patricia Pasemko
Operations Manager

CLASS

2258 04 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations
2258 84 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations - To U.S. Requirements

PRODUCTS

Class I, Division 2, Groups A, B, C and D

100 Series Raven Intrinsically Safe Barriers; Models 100, 101 and 102; Input power 4.5 to 30Vdc @ 100mA; Temperature Code T6; Maximum ambient 60°C; suitable for installation in Class I, Division 2, Groups A, B, C and D; Provides Intrinsically Safe outputs for Class I, Division 1, Groups A, B, C and D; Entity parameters as follows: Voc = 5.9Vdc, Isc = 60mA, Ca = 31uF, La = 9.9mH

Note: Din rail mount version is for installation in a suitable enclosure subject to the approval of the local inspection authorities.

The 'C' and 'US' indicators adjacent to the CSA Mark signify that the product has been evaluated to the applicable CSA and ANSI/UL Standards, for use in Canada and the U.S., respectively. This 'US' indicator includes products eligible to bear the 'NRTL' indicator. NRTL, i.e. National Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to U.S. Standards.

Certificate: 1468207 **Master Contract:** 207045

Project: 1468207 **Date:** 2003-11-20

APPLICABLE REQUIREMENTS

C22.2 No 0 - M1991	General Requirements - Canadian Electrical Code Part II.
C22.2 No 142 - M1987	Process Control Equipment.
C22.2 No 157 - M1992	Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations.
C22.2 No 213 - M1987	Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations.
UL 508, Seventeenth Edition	Industrial Control Equipment.
UL 913, Sixth Edition	Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, II, III, Division 1, Hazardous (Classified) Locations.
UL 1604, Third Edition	Electrical Equipment for Use in Class I and II, Division 2, And Class III Hazardous (Classified) Locations.

CSA INTERNATIONAL

Supplement to Certificate of Compliance

Certificate: 1468207 **Master Contract:** 207045

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
1468207	2003-11-20	Original Certification of 100 Series Raven Barriers.