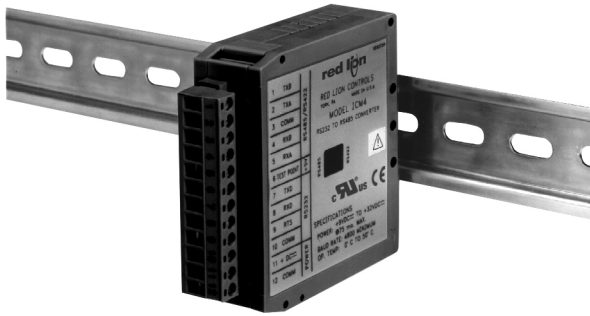


Model ICM4 - Serial Converter Module (RS-232C/RS-485)



- ALLOWS COMMUNICATIONS BETWEEN RS-232 CONTROL EQUIPMENT AND PRODUCTS WITH RS-485 SERIAL COMMUNICATIONS
- WIDE DC INPUT POWER RANGE (+9 to 32 VDC)
- HALF DUPLEX (RS-485) AND FULL DUPLEX (RS-422)
- LED INDICATION FOR RXD, TXD, and POWER
- UNIVERSAL MOUNTING FOOT FOR DIN RAIL INSTALLATION

UL Recognized Component,
 File # E179259



DESCRIPTION

The ICM4 Serial Converter Module provides the capability of interfacing equipment with RS-485 serial communications to equipment with RS-232 communications. Data format of the RS-232 and RS-485 equipment must be the same.

For full duplex (RS-422), the DIP switch on the side of the module must be in the RS-422 position. For half duplex (RS-485), the DIP switch must be in the RS-485 position. In half duplex mode, the RS-485 driver is enabled using the leading edge of the first character transmitted (RXD input). After the last character transmits, the converter waits one character time (at 9600 baud) to disable the RS-485 driver.

There are 3 LED's that can be viewed from the front of the converter module. A green power LED indicates power is on, a red RS-232 TXD LED flashes when the module is transmitting, and a green RS-232 RXD LED flashes when the module is receiving.

An external DC power source (+9 to 32 VDC) is required to power the ICM4. The external power source and serial communications connections are made via a 12 position removable terminal block located on the front of the module.

The unit is equipped with a universal mounting foot for attachment to standard DIN style mounting rails, including top hat profile rail according to EN50022 - 35 x 7.5 and 35 x 15, and G profile rail according to EN50035 - G32.

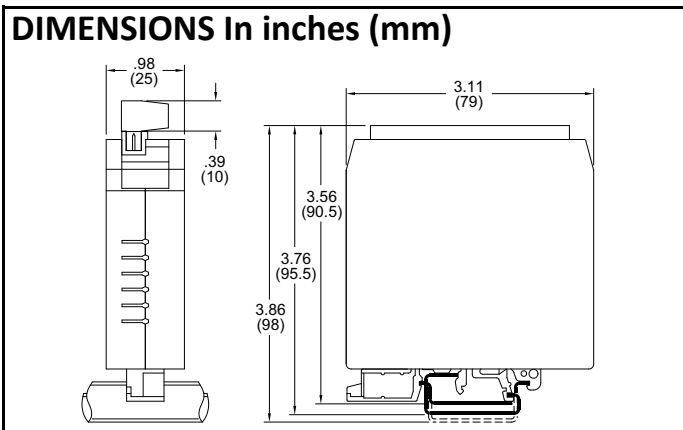
SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in this literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



CAUTION: Risk of Danger.
 Read complete instructions prior to installation and operation of the unit.

DIMENSIONS In inches (mm)



SPECIFICATIONS

- POWER:** +9 to 32 VDC @ 75 mA maximum. Above 26 VDC, derate max. operating temperature to 40 °C. Power supply must be Class 2 or SELV rated.
- RS232 VOLTAGES:**
 Receive Data Pin: ± 30 VDC max.
 Mark Condition: ≤ 0.8 VDC
 Space Condition: ≥ 2.4 VDC
 Transmit Data Pin:
 Mark Condition: -8 VDC (typ.)
 Space Condition: $+8$ VDC (typ.)
- RS485 VOLTAGES:**
 Differential Output Voltage: ± 5 VDC max. under no load
 Differential Input Voltage: ± 5 VDC max.
 Mark Condition: ≤ -0.2 VDC
 Space Condition: $\geq +0.2$ VDC
 RS485 Drive Capability: Up to 32 RS-485 receivers connected in parallel.
 RS485 Drive Disable Time: 4 msec. max.
- MAXIMUM CABLE LENGTH:**
 RS232: 50 feet
 RS485: 4000 feet
- BAUD RATE:** 9600 min., 19200 max.
- CERTIFICATIONS AND COMPLIANCES:**
CE Approved
 EN 61326-1 Immunity to Industrial Locations
 Emission CISPR 11 Class B
 Safety requirements for electrical equipment for measurement, control, and laboratory use:
 EN 61010-1: General Requirements
 RoHS Compliant
 UL Recognized Component: File #E179259
 IP20 Enclosure rating (Rear of unit)
 Refer to *EMC Installation Guidelines* section of the bulletin for additional information.
- ENVIRONMENTAL CONDITIONS:**
 Operating Temperature Range: 0 to 50 °C. Derate max. operating temperature to 40 °C above 26 VDC.
 Storage Temperature: -40 to +75 °C
 Operating and Storage Humidity: 85% max.relative humidity (non-condensing) from 0 to 50 °C
 Vibration to IEC 68-2-6: Operational 5 to 150 Hz, 2 g.
 Shock to IEC 68-2-27: Operational 30 g.
 Altitude: Up to 2000 meters
- CONSTRUCTION:** Case body is black, high impact plastic. Installation Category I, Pollution Degree 2.
- MOUNTING:** Standard DIN rail top hat (T) profile rail according to EN50022- 35 X 7.5 and 35 X 15
- WEIGHT:** 3.2 oz. (90.7 g)

EMC INSTALLATION GUIDELINES

Although Red Lion Controls products are designed with a high degree of immunity to Electromagnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into a unit may be different for various installations. Cable length, routing, and shield termination are very important and can mean the difference between a successful or troublesome installation. Listed are some EMI guidelines for a successful installation in an industrial environment.

1. A unit should be mounted in a metal enclosure, which is properly connected to protective earth.
2. Use shielded cables for all Signal and Control inputs. The shield connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
 - a. Connect the shield to earth ground (protective earth) at one end where the unit is mounted.
 - b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is over 1 MHz.
3. Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors, feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run through metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter. Also, Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
4. Long cable runs are more susceptible to EMI pickup than short cable runs.
5. In extremely high EMI environments, the use of external EMI suppression devices such as Ferrite Suppression Cores for signal and control cables is effective. The following EMI suppression devices (or equivalent) are recommended:

Fair-Rite part number 0443167251 (Red Lion Controls # FCOR0000)
Line Filters for input power cables:

Schaffner # FN2010-1/07 (Red Lion Controls # LFIL0000)

6. To protect relay contacts that control inductive loads and to minimize radiated and conducted noise (EMI), some type of contact protection network is normally installed across the load, the contacts or both. The most effective location is across the load.
 - a. Using a snubber, which is a resistor-capacitor (RC) network or metal oxide varistor (MOV) across an AC inductive load is very effective at reducing EMI and increasing relay contact life.
 - b. If a DC inductive load (such as a DC relay coil) is controlled by a transistor switch, care must be taken not to exceed the breakdown voltage of the transistor when the load is switched. One of the most effective ways is to place a diode across the inductive load. Most Red Lion products with solid state outputs have internal zener diode protection. However external diode protection at the load is always a good design practice to limit EMI. Although the use of a snubber or varistor could be used.

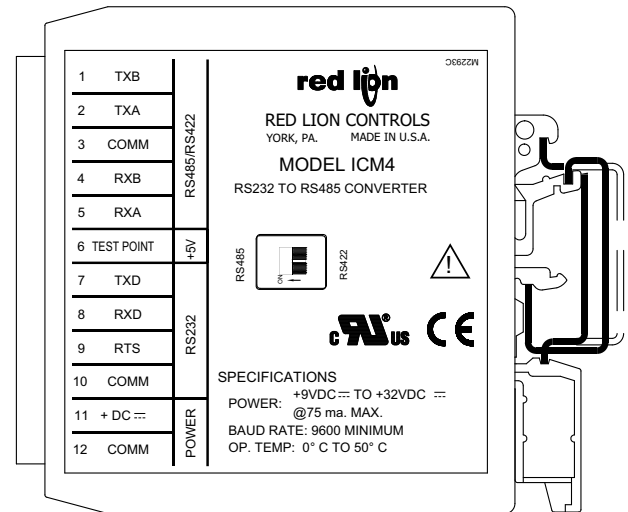
Red Lion part numbers: Snubber: SNUB0000

Varistor: ILS11500 or ILS23000

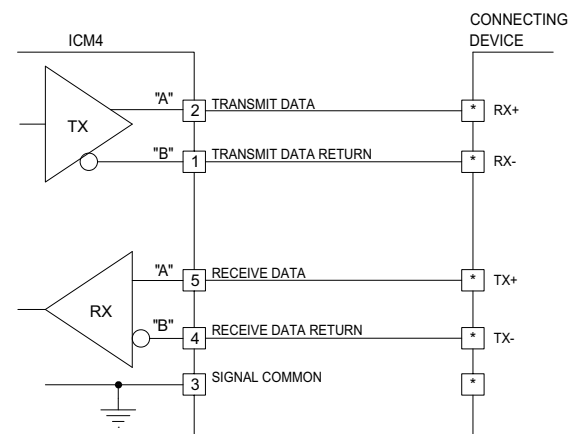
7. Care should be taken when connecting input and output devices to the instrument. When a separate input and output common is provided, they should not be mixed. Therefore a sensor common should NOT be connected to an output common. This would cause EMI on the sensitive input common, which could affect the instrument's operation.

Visit www.redlion.net/emi for more information on EMI guidelines, Safety and CE issues as they relate to Red Lion products.

SIDE VIEW OF ICM4



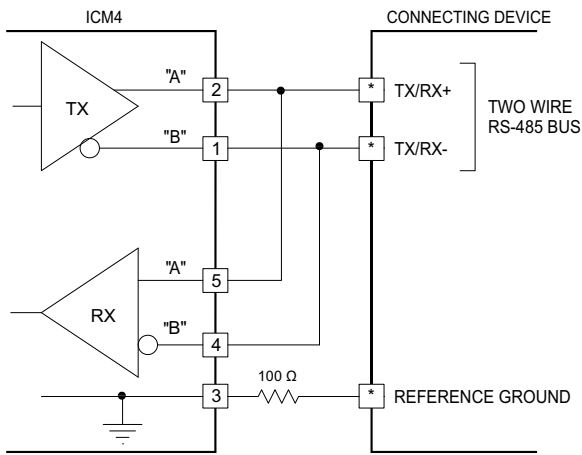
TYPICAL RS-422 CONNECTIONS



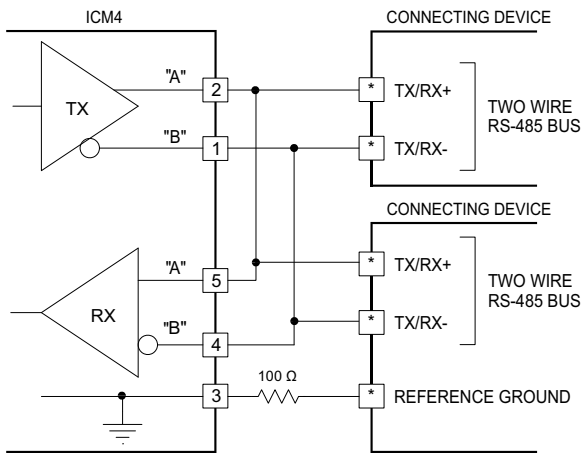
Notes:

1. Connect shield drain wire to earth ground.
2. Place DIP switch on the side of the ICM4 in the 422 position.
3. RS-422 polarity: Terminal "A" is negative with respect to Terminal "B" in the mark (logic 1) condition.

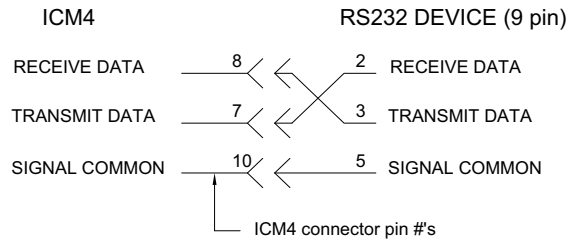
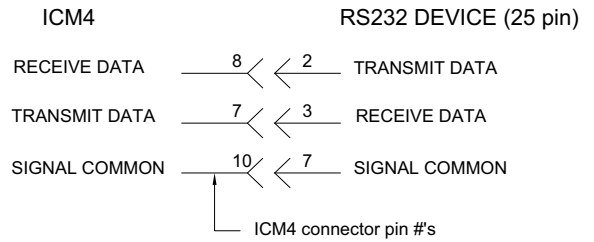
TYPICAL RS-485 CONNECTIONS



TYPICAL MULTIPLE RS-485 CONNECTIONS



TYPICAL RS-232 CONNECTIONS



Notes:

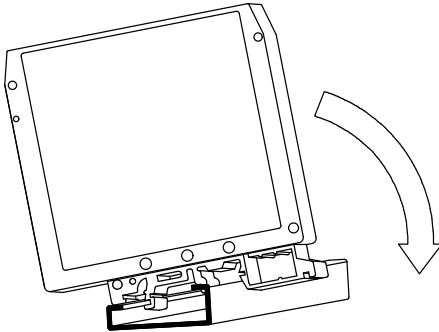
1. Connect shield drain wire to earth ground.
2. Place DIP switch on the side of the ICM4 in the 485 position.
3. The transmit and receive data lines of the ICM4 should be wired together.

INSTALLATION

The unit is equipped with a universal mounting foot for attachment to standard DIN style mounting rails, including G profile rail according to EN50035 - G32 , and top hat (T) profile rail according to EN50022 - 35 x 7.5 and 35 x 15. The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

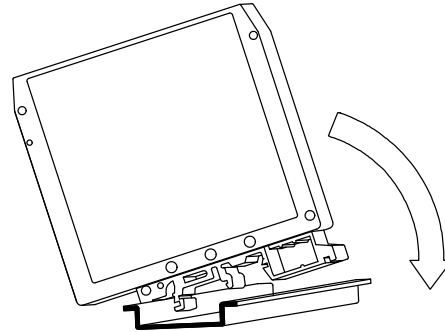
G Rail Installation

To install the ICM4 on a "G" style DIN rail, angle the module so that the upper groove of the "foot" catches under the lip of the top rail. Push the module toward the rail until it snaps into place. To remove a module from the rail, push up on the bottom of the module while pulling out away from the rail.



T Rail Installation

To install the ICM4 on a "T" style rail, angle the module so that the top groove of the "foot" is located over the lip of the top rail. Push the module toward the rail until it snaps into place. To remove a module from the rail, insert a screwdriver into the slot on the bottom of the "foot", and pry upwards on the module until it releases from the rail.



ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
ICM4	RS-232/RS-485 Converter Module	ICM40030

TROUBLESHOOTING

If for any reason you have trouble operating, connecting, or simply have questions concerning your new unit, contact Red Lion's technical support.

Email: support@redlion.net
 Website: www.redlion.net
 Inside US: +1 (877) 432-9908
 Outside US: +1 (717) 767-6511

LIMITED WARRANTY

(a) Red Lion Controls Inc., Sixnet Inc., N-Tron Corporation, or Blue Tree Wireless Data, Inc. (the "Company") warrants that all Products shall be free from defects in material and workmanship under normal use for the period of time provided in "Statement of Warranty Periods" (available at www.redlion.net) current at the time of shipment of the Products (the "Warranty Period"). **EXCEPT FOR THE ABOVE-STATED WARRANTY, COMPANY MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE PRODUCTS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (C) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.** Customer shall be responsible for determining that a Product is suitable for Customer's use and that such use complies with any applicable local, state or federal law.

(b) The Company shall not be liable for a breach of the warranty set forth in paragraph (a) if (i) the defect is a result of Customer's failure to store, install, commission or maintain the Product according to specifications; (ii) Customer alters or repairs such Product without the prior written consent of Company.

(c) Subject to paragraph (b), with respect to any such Product during the Warranty Period, Company shall, in its sole discretion, either (i) repair or replace the Product; or (ii) credit or refund the price of Product provided that, if Company so requests, Customer shall, at Company's expense, return such Product to Company.

(d) **THE REMEDIES SET FORTH IN PARAGRAPH (c) SHALL BE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH IN PARAGRAPH (a).**