

Model: rdc232iso

Non-powered EIA/RS-232 Isolator (3-wire: Txd, Rxd, Signal Gnd)



The rdc232iso safely connects two RS-232 devices without danger of ground loops and damaging surges. The RS-232 signals and ground have 5000-volt optical isolation with coating.

The data lines Txd & Rxd are fully isolated, plus over 1 million ohms of resistance is added to the ground path. This effectively decouples the signal grounds, preventing ground loops and common-mode surge currents. The rdc232iso has one DTE and one DCE 9-pin d-shell with computer-style pin-outs.

RS-232 port Description:

Signal Type EIA/RS-232 (C to F)
 Voltage Levels +/- 6v to +/- 15v DC
 Permitted Surge +/- 25v DC
 Surge Diodes Installed (none – use rdc232ir5 if required)

Isolation RS-232 to RS-232 (ISO/IEC 9549):

Model: rdc232iso 5000v (conformal coated)

Power Supply Options:

None required, draws power from RS-232 signal pins.

Note: *Connecting external power to handshake lines may damage the isolator. Contact technical support for more information.*

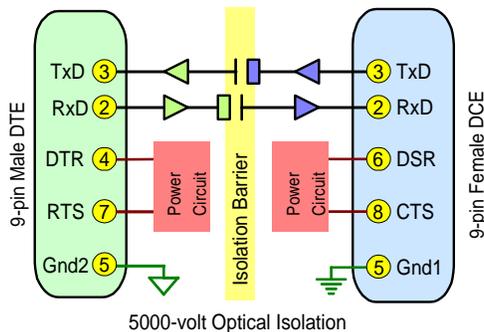
Communication:

Rated Speed At least 38,400 bps
 Possible Speed Up to 57 kbps (depends on the physical properties of attached RS-232 port and varies device to device)
 Character Setting Transparent, no config required
 User Indication (none – use rdc232ir5 if required)
 Standard Distance 15m or 2500pf per wire

Environmental:

Operating temperature -40C° to + 65C°
 Storage temperature -40C° to +100C°
 Relative Humidity 10 to 95% RH, non condensing
 Weight 21g
 DB9 Connector Pins 30µ gold pins, 500 insertion cycles
 RoHS Compliant Yes (with the exception of lead)

Block Diagram:



Application Details:

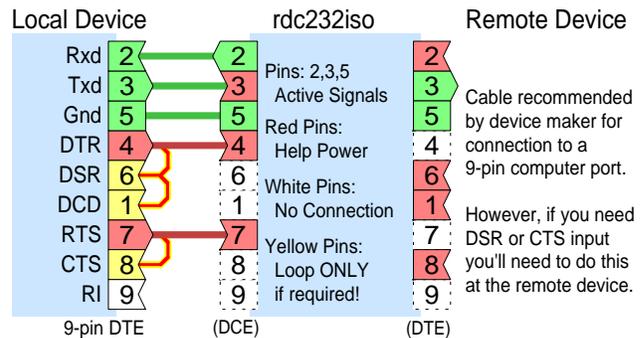
Contrary to what some vendors imply, RS-232 was *never* designed to “power” external devices. Current from compliant RS-232 chips varies between vendors, but stays in the range of 1mA to 15mA. This is not very much power. Thus the performance of any self-power device is greatly affected by the chips used in the driving device. You will find the rdc232iso (or any “self-powered” device) works better with some equipment than others.

To get maximum performance and reliability, we recommend that all driven signals be connected. This is Txd, DTR, and RTS on the DCE side and Rxd, DSR, CTS, and DCD on the DTE side. While the rdc232iso often operates with only the power from the transmit pin, the more driver signals you connect, the better it performs. The rdc232iso works whether the control signals are low or high.

When to use an isolator?

- When connecting a notebook to industrial equipment
- When connecting equipment from 2 different vendors
- When connecting control room to factory floor devices
- When connecting UPS powered devices to non-UPS powered devices
- When connecting radio or wire modems (lightning/surge attractors) to most other equipment.

Cable Connection:

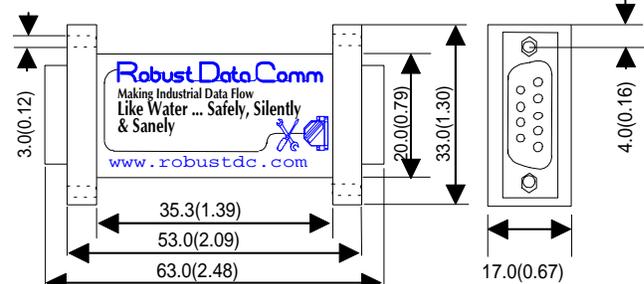


Note: *The desire to maximize the power available for a cleaner RS-232 signal means you don't want to connect receive pins at attached device unless required.*

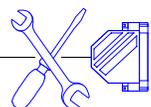
Order Information:

rdc232iso	Non-Powered 3-wire RS-232 Isolator
	Standard option for all units
*	Conformal Coating (for 5000v isolation) plus includes 30µ gold pins in connector

Mechanical Dimensions: mm (inches)



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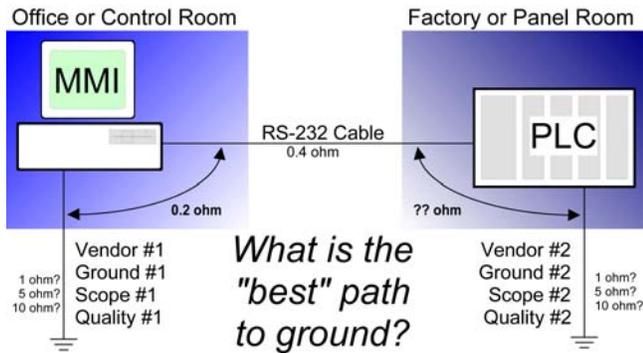


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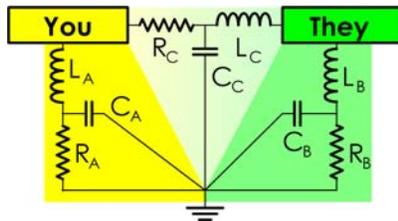
Non-powered EIA/RS-232 3-wire Isolator

Why Galvanically Isolate Your RS-232?

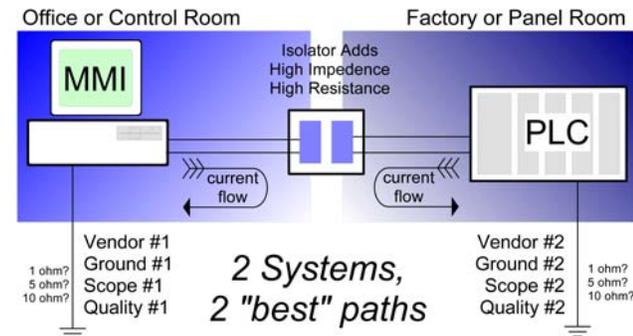
RS-232 is perhaps the most common – *and very fragile* – serial interface. The digital grounds of the connected devices are directly together with very low resistance. This creates a ground loop and multiple paths to ground within the combined system. Suppose your ground path is better than theirs? Then current and surge energy will flow from their system into your system through the RS-232 ports. This leads to damage and downtime.



Here is another way to view the problem. With RS-232 between 2 systems you have multiple ground paths from any point, each with different electrical characteristics. "You" have inductance (L_A), resistance (R_A), and capacitance (C_A) to the site ground. "They" have L_B , R_B , and C_B to the site ground. Linking the two panels with RS-232 adds L_C , R_C , and C_C . **From here it's just Ohms law.** If surge energy enters "their" panel, part of the surge current will flow out L_B & R_B to earth and part through "you" by L_A+L_C & R_A+R_C . How much current will pass through "you" depends on the details, but if the original surge was lightning induced and perhaps 15,000-Amps, seeing even 1% of the energy (150-Amps) could easily destroy "your" equipment. **So "their" mistake can cost "you" money!**



Adding full galvanic isolation between the two systems eliminates all grounding plus most surge problems. L_C and R_C approach infinity and we effectively block any current flow across the RS-232.



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Before we had two systems sharing multiple ground paths with the risk of current flow between them. Now we have two fully separate ground systems without current flow between them. The quality of your ground is their problem - just as the quality of your ground is your problem. **It is the RS-232 equivalent of Robert Frost's "Good Fences make Good Neighbors"**. Galvanic isolation breaks the ground path by using air-gaps, transformers, and/or optical devices. Galvanic isolation allows data to flow between systems, but not electrical current. This protects your equipment, your warranty repair budget, and your reputation for reliability.

Other Industrial Products:

Robust DataComm has created a full line of robust industrial products featuring isolation, surge protection, and DIN-rail mount. Available power options include: 9 - 36vDC, 9 - 36vAC, 48vDC \pm 20%, and 5vDC \pm 5%.



rdc232ir, rdc422ir, rdc485ir:

Isolated repeaters for RS232, RS-422 and RS-485
(rdc485ir also converts 4-wire RS-422/485 to 2-wire)

rdc422ic, rdc485ic:

Isolated converters from RS232 to RS-422 and RS-485

rdc232fo, rdc485fo:

Converters from fiber optics to RS232, RS-422 and RS-485

rdcLPU:

20kA lightning protection for robust RS-422 and RS-485

Useful Application Information:

Our web site (www.robustdc.com) includes many insightful application notes covering effective grounding and use of RS-232, RS-422, RS-485, Fiber Optics and Lightning Protection.

App Note 1: Why Galvanically Isolate Your RS-232 lines?

App Note 5: Grounding RS-422 and RS-485

App Note 6: Troubleshooting RS-485

App Note 7: RS-232 Robust Enough for Industrial Systems

App Note 8: Extending RS-232 with RS-422/485 & Fiber Optics

App Note 11: Using Isolated RS-485 Repeater

App Note 18: Surge Management 101 – a Simple Primer

App Note 31: Lightning Proof RS-422 and RS-485

App Note 32: Increasing RS-485 Robustness

For More Information:

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