



## Industrial Opto-Isolated RS-232 to RS-422/485 Converter

# Convert RS-232 data signals to RS-422/485 signals in heavy industrial areas.

Rugged IP30-rated metal case for panel mounting



### Overview

- A heavy-duty, industrial-strength converter.
- Converts RS-232 to RS-422/485, extending signals up to 4000 feet (121.9 m).
- Rugged, IP30-rated metal case for panel mounting.
- Tolerates temperatures ranging from -40 to +176° F (-40 to +80° C).
- Designed to withstand both shock and vibration.
- Boasts 2-kV triple isolation for safeguarding data and equipment.
- DB9 port on the RS-232 side and a removable terminal block for RS-422/485 links.
- Data rates up to 115.2 kbps.

This heavy-duty Industrial Opto-Isolated RS-232 to RS-422/485 Converter makes it easy to convert unbalanced, full- or half-duplex RS-232 to balanced RS-422/485 while extending signals up to 4000 feet (121.9 m).

Encased in an IP30-rated enclosure, the converter's been put through some of the most exacting tests in the industry. The high-grade converter meets the requirements of two standards that make it suitable for electrical substation installations—IEC 61850-3 and IEEE 1613—specifications that are more stringent than NEMA TS1/TS2 requirements for transportation applications.

### Customer Support Information

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)  
 FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746  
 Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018  
 Web site: [www.blackbox.com](http://www.blackbox.com) • E-mail: [info@blackbox.com](mailto:info@blackbox.com)

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## Specifications

**Approvals** — IEC 61850-3, IEEE 1613, FCC, CE, RoHS

**Bias Built-in** — Switchable 1.2K ohms XMT/RCV

**Clamping Time** — < 1 picosecond

**Data Rates** — 1.2–115.2 kbps

**Distance (Maximum)** — 4000 ft. (121.9 m)

**Enclosure** — IP30-rated metal, panelmount

**Industrial Bus** — MODBUS ASCII / RTU

**Insulation Resistance** —  $\geq 500\text{ M @ }500\text{ VDC}$

**Isolation** — 2 kV RMS, 1 minute

**Maximum Torque** — 5 kg/cm

**MTBF** — 163,611 hours;

calculation method: parts count reliability prediction

**Pitch** — 5.08 mm

**Surge Protection** — 600 watts peak power dissipation

**Termination Built-in** — Switchable 120 ohms

**Wire Size Accepted** — 28 to 12 AWG

**Connectors** — RS-232: (1) DB9 F;

RS-422/RS-485: (1) 5-position terminal block (removable)

**Indicators** — LEDs: (1) Power, (1) TD (transmit data) and (1) RD (receive data) on both the RS-232 and RS-422/RS-485 connectors

**Operating Environment** — Temperature: -40 to +176° F (-40 to +80° C);

Humidity: 0 to 95%, noncondensing

**Power** — From an external power supply (not included);

Input: 10–48 VDC (56 VDC maximum) on 2-position terminal block (removable);

Consumption: 0.5 W typical (1.9 W with termination)

**Size** — 1.3"H x 3.7"W x 5.2"D (3.3 x 9.4 x 13.2 cm)

**Weight** — 0.5 lb. (0.2 kg)

## Product Information

### IEC 61850-3 Electromagnetic Interference Specifications

Test	Description		Test Level	Level
61000-4-2	ESD	Enclosure Contact	8 kV	4
		Enclosure Air	15 kV	4
61000-4-3	Radiated RFI	Enclosure Ports	10 V/m	–
61000-4-4	Burst (Fast Transient)	Signal Ports	4 kV @ 2.5 KHz	–
		DC Power Ports	4 kV	4
61000-4-5	Surge	Signal Ports	2 kV Line to Ground, 1 kV Line to Line	4
		DC Power Ports	2 kV Line to Ground, 1 kV Line to Line	3
61000-4-6	Induced (Conductive) RFI	Signal Ports	10 V RMS	3
		DC Power Ports	10 V RMS	3
61000-4-12	Damped Oscillatory	Signal Ports	2.5 kV Common, 1 kV Diff Mode @ 1 MHz	3
		DC Power Ports	2.5 kV Common, 1 kV Diff Mode @ 1 MHz	3
61000-4-16	Mains Frequency Voltage	Signal Ports	30 V Continuous, 300 V for 1 s	4
		DC Power Ports	30 V Continuous, 300 V for 1 s	4
61000-4-17	Ripple on DC Power Supply	DC Power Ports	10%	3

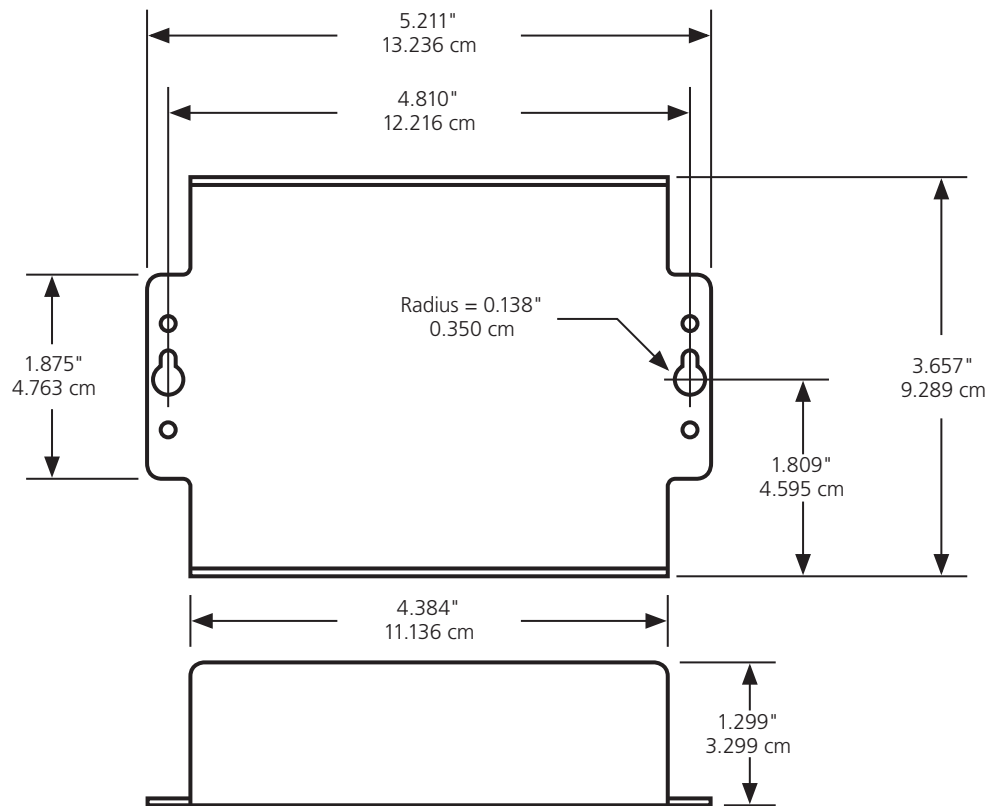
### IEEE 11613 C37 Electromagnetic Interference Specifications

Test	Description		Test Level	Level
C37.90.3	ESD	Enclosure Contact	8 kV	–
		Enclosure Air	15 kV	–
C37.90.2	Radiated RFI	Enclosure Ports	10 v/m	–
C37.90.1	Burst (Fast Transient)	Signal Ports	4 kV @ 2.5 kHz	–
		DC Power Ports	4 kV	–

### Environmental Specifications

Test	Description		Test Level	Level
60068-2-1	Cold Temperature	Test Ad	-40° F (-40° C), 16 Hours	–
60068-2-2	Dry Heat	Test Bd	+176° F (+80° C), 16 Hours	–
60068-2-30	Humidity (Damp Heat Cycle)	Test Dd	90% (Noncondensing) +131° F (+55° C), 6 Cycles	–
60255-21-1	Vibration	Test Fc	0.1 oz. (2 g) @ 10 to 150 Hz	Class 2
60255-21-2	Shock	Test Ea	1.1 oz. (30 g) @ 11 mS	Class 2
60068-2-32	Drop	--	6 Faces, 3 Edges, Total 10 Drops at 1 m	–

## Mounting Dimensions



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