

ULI-232DS
ULI-232DSH
ULI-232TC
ULI-232DC
ULI-232DE

BB-9SPOP2
 BB-9POP4
 BB-232OPDR
 BB-232OPDRI
 BB-232OPDRI-PH

**Industrial-grade, Isolated
 RS-232 Isolators & Repeaters**



Features

- Optical isolation protects RS-232 data and equipment
- Repeaters extend RS-232 data an additional 15 meters
- Data rates up to 230.4 kbps
- 2.0 kV optical isolation on 2 or 3 lines (by model)
- Wide operating temperature range (by model)
- IP30 metal or plastic enclosures options
- In-line, DIN rail, panel mount installation options
- Port or external PSU powering options

Introduction

Advantech rugged isolators and isolated repeaters are ideal for demanding industrial applications. Optical isolation on input and output lines protects RS-232 data and equipment from surges, voltage shorts and ground loops caused by lightning or heavy electrical loads. Model ULI-232DC provides triple isolation on input, output and power lines and is UL Listed, UL C1/D2 rated. Heavy industrial Model ULI-232DE provides triple isolation and is IEC61851-3 and IEEE-1613 rated for electrical substation use.

Specifications

Serial Technology

Model:	Data Rate (max):	RS-232 Connectors:
ULI-232DS*	115.2 kbps	DB9 female (DTE) DB9 male (DCE)
ULI-232DSH	230.4 kbps	DB9 female (DCE) DB9 male (DTE)
ULI-232TC	115.2 kbps	Terminal block
ULI-232DC		DB9 female (DCE)
ULI-232DE		DB9 male (DTE)

LED Indicators

Model:	LED Indicators:
ULI-232DS	-
ULI-232DSH	
ULI-232TC	Data LEDs for each side of isolator. Power LED.
ULI-232DC	Data LEDs for TD, RD, CTS, RTS.
ULI-232DE	Power LED.

Isolation & ESD Protections

Model:	Optical Isolation:	Isolated Lines:	ESD Protection:
ULI-232DS	2.0 kV	Input, Output	8 kV air
ULI-232DSH			
ULI-232TC		Input, Output, Power	15 kV air
ULI-232DC			
ULI-232DE			

RS-232 Signal Range

Model:	Function:	Signal Range:
ULI-232DS	RS-232 isolator	15m
ULI-232DSH		
ULI-232TC	RS-232 repeater	30m
ULI-232DC		
ULI-232DE		

Power

Model:	Source:	Connector:	Input:	Consumption:
ULI-232DS	Port powered. DTE: DTR, RTS DCE: DCD, DSR, CTS	-	5 Vdc	Port powered
ULI-232DSH	External PSU*	2.5mm jack	12 Vdc	731 mW
ULI-232TC		Terminal block	10 to 30 Vdc	1.2 W
ULI-232DC		Terminal block (2-position, removable, 28-12 AWG wire, 4 kgf/cm torque)	10 to 48 Vdc (56 Vdc, max.)	0.55 W (1.5 W, max.)
		Terminal block (2-position, removable, 24-21 AWG copper wire only, 5.08 mm pitch, 5 kg/cm torque, ≥500 MΩ @ 500 Vdc insulation resistance)		
ULI-232DE				

* External PSU required, not included, sold separately.

Mechanical

Model:	Enclosure:	Dimensions, mm:	Mounting:	Weight, gm
ULI-232DS	Plastic	61 x 33 x 17	In-line	36.3
ULI-232DSH		104 x 43 x 20	In-line	54.5
ULI-232TC	IP30 plastic	95 x 79 x 25	DIN rail, panel option	90.7
ULI-232DC		123 x 113 x 32	DIN rail	195
ULI-232DE	IP30 metal	132 x 93 x 31	Panel, DIN rail option	208.7

Environmental

Model:	Operating Temperature:	Storage Temperature:	Operating Humidity:
ULI-232DS	0 to +70 °C	-55 to +125 °C	0 to 95%, non-condensing
ULI-232DSH			
ULI-232TC	-40 to +80 °C	-40 to +85 °C	
ULI-232DC			
ULI-232DE			

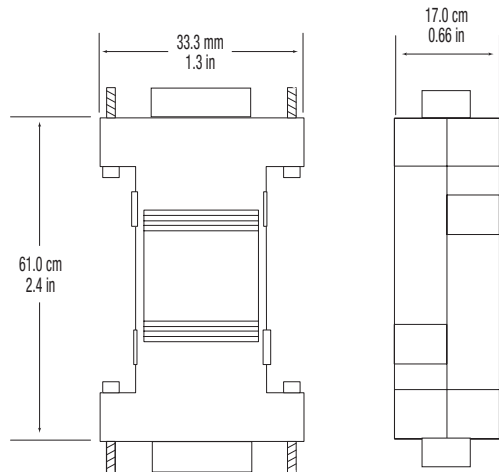
Meantime Between Failures (MTBF)

- **Calculation Method** MIL217F Parts Count Reliability Prediction

Model:	Hours:
ULI-232DS	674717
ULI-232DSH	262084
ULI-232TC	244689
ULI-232DC	177250
ULI-232DE	194712

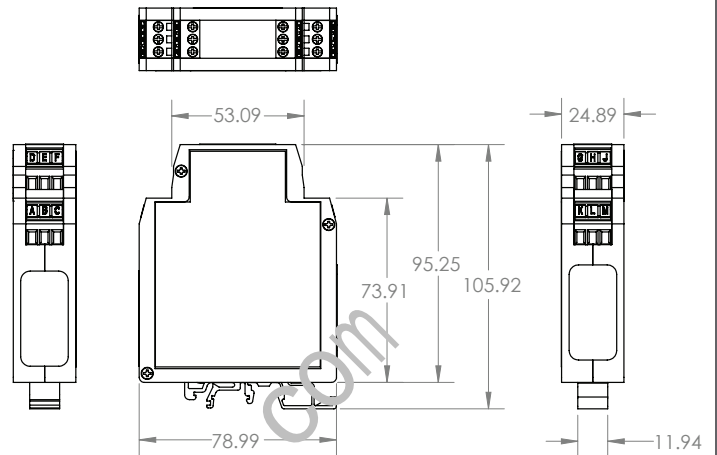
Dimensions - ULI-232DS

Unit = mm/in



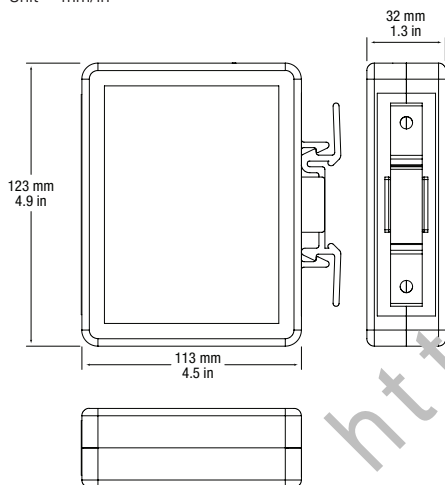
Dimensions - ULI-232TC

Unit = mm



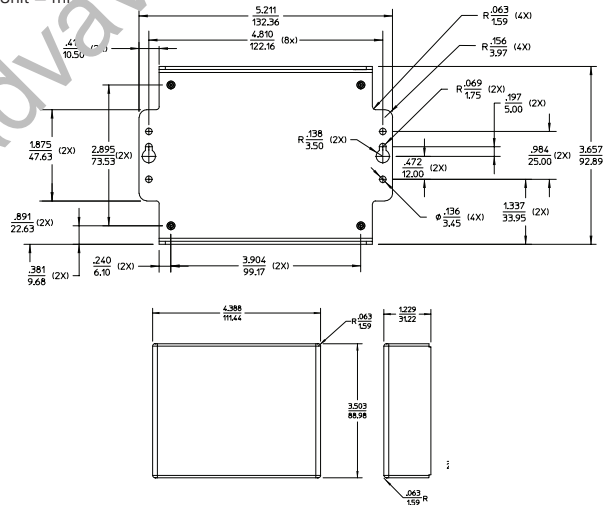
Dimensions - ULI-232DC

Unit = mm/in



Dimensions - ULI-232DE

Unit = mm



Ordering Information

Model	Part Number to Order	Description
ULI-234DS	BB-9SPOP2	Industrial RS-232 Optical Isolator – 2.0 kV 2-way isolation, 115.2 kbps, port powered.
ULI-234DSH	BB-9SPOP4	Industrial RS-232 Optical Isolator – 2.0 kV 2-way isolation, 230.4 kbps. <i>PSU not included.</i>
ULI-234TC	BB-232OPDR	Industrial Isolated RS-232 Repeater – 2.0 kV 2-way isolation, 115.2 kbps, wide operating temp., UL Recognized. <i>PSU not included.</i>
ULI-234DC	BB-232OPDRI	Industrial Isolated RS-232 Repeater – 2.0 kV 3-way isolation, 115.2 kbps, wide operating temp., UL C1/D2, UL508. <i>PSU not included.</i>
ULI-234DE	BB-232OPDRI-PH	Industrial Isolated RS-232 Repeater – 2.0 kV 3-way isolation, 115.2 kbps, wide operating temp., IEC61850-3, IEEE1613. <i>PSU not included.</i>

ULI-232 Series Selection Guide

Industrial Heavy-duty, RS-232 Isolators & Repeaters



Common Features

- Optical isolation protects RS-232 data and equipment
- Repeaters extend RS-232 data an additional 15 meters
- Data rates up to 230.4 kbps
- 2.0 kV optical isolation on 2 or 3 lines (by model)
- Wide operating temperature range (by model)
- IP 30 metal or plastic enclosures options
- In-line, DIN rail, panel mount installation options
- Port or external PSU powering options

Serial Converters Comparison Table

Model Number	ULI-232DS	ULI-232DSH	ULI-232TC	ULI-232DC	ULI-232DE		
Part Number to Order	BB-9SPOP2	BB-9POP4	BB-232OPDR	BB-232OPDRI	BB-232OPDRI-PH		
Description	RS-232 Isolators		2-way Isolated RS-232 Repeater	Rugged, 3-way Isolated RS-232 Repeater	Hardened, 3-way Isolated RS-232 Repeater		
Key Features	Port-powered – no PSU needed	230.4 kbps, suitable for laptops, low-power ports	UL Recognized Component Terminal block connectors	UL C1/D2, UL 508, Oil & Gas applications	UL C1/D2, IEC 61850-3, IEC 61850-4, IEC 61850-5, IEC 61850-6, IEC 61850-7, IEC 61850-8, IEC 61850-9, IEC 61850-10, IEC 61850-11, IEC 61850-12, IEC 61850-13, IEC 61850-14, IEC 61850-15, IEC 61850-16, IEC 61850-17, IEC 61850-18, IEC 61850-19, IEC 61850-20, IEC 61850-21, IEC 61850-22, IEC 61850-23, IEC 61850-24, IEC 61850-25, IEC 61850-26, IEC 61850-27, IEC 61850-28, IEC 61850-29, IEC 61850-30, IEC 61850-31, IEC 61850-32, IEC 61850-33, IEC 61850-34, IEC 61850-35, IEC 61850-36, IEC 61850-37, IEC 61850-38, IEC 61850-39, IEC 61850-40, IEC 61850-41, IEC 61850-42, IEC 61850-43, IEC 61850-44, IEC 61850-45, IEC 61850-46, IEC 61850-47, IEC 61850-48, IEC 61850-49, IEC 61850-50, IEC 61850-51, IEC 61850-52, IEC 61850-53, IEC 61850-54, IEC 61850-55, IEC 61850-56, IEC 61850-57, IEC 61850-58, IEC 61850-59, IEC 61850-60, IEC 61850-61, IEC 61850-62, IEC 61850-63, IEC 61850-64, IEC 61850-65, IEC 61850-66, IEC 61850-67, IEC 61850-68, IEC 61850-69, IEC 61850-70, IEC 61850-71, IEC 61850-72, IEC 61850-73, IEC 61850-74, IEC 61850-75, IEC 61850-76, IEC 61850-77, IEC 61850-78, IEC 61850-79, IEC 61850-80, IEC 61850-81, IEC 61850-82, IEC 61850-83, IEC 61850-84, IEC 61850-85, IEC 61850-86, IEC 61850-87, IEC 61850-88, IEC 61850-89, IEC 61850-90, IEC 61850-91, IEC 61850-92, IEC 61850-93, IEC 61850-94, IEC 61850-95, IEC 61850-96, IEC 61850-97, IEC 61850-98, IEC 61850-99, IEC 61850-100	UL C1/D2, IEC 61850-3, IEC 61850-4, IEC 61850-5, IEC 61850-6, IEC 61850-7, IEC 61850-8, IEC 61850-9, IEC 61850-10, IEC 61850-11, IEC 61850-12, IEC 61850-13, IEC 61850-14, IEC 61850-15, IEC 61850-16, IEC 61850-17, IEC 61850-18, IEC 61850-19, IEC 61850-20, IEC 61850-21, IEC 61850-22, IEC 61850-23, IEC 61850-24, IEC 61850-25, IEC 61850-26, IEC 61850-27, IEC 61850-28, IEC 61850-29, IEC 61850-30, IEC 61850-31, IEC 61850-32, IEC 61850-33, IEC 61850-34, IEC 61850-35, IEC 61850-36, IEC 61850-37, IEC 61850-38, IEC 61850-39, IEC 61850-40, IEC 61850-41, IEC 61850-42, IEC 61850-43, IEC 61850-44, IEC 61850-45, IEC 61850-46, IEC 61850-47, IEC 61850-48, IEC 61850-49, IEC 61850-50, IEC 61850-51, IEC 61850-52, IEC 61850-53, IEC 61850-54, IEC 61850-55, IEC 61850-56, IEC 61850-57, IEC 61850-58, IEC 61850-59, IEC 61850-60, IEC 61850-61, IEC 61850-62, IEC 61850-63, IEC 61850-64, IEC 61850-65, IEC 61850-66, IEC 61850-67, IEC 61850-68, IEC 61850-69, IEC 61850-70, IEC 61850-71, IEC 61850-72, IEC 61850-73, IEC 61850-74, IEC 61850-75, IEC 61850-76, IEC 61850-77, IEC 61850-78, IEC 61850-79, IEC 61850-80, IEC 61850-81, IEC 61850-82, IEC 61850-83, IEC 61850-84, IEC 61850-85, IEC 61850-86, IEC 61850-87, IEC 61850-88, IEC 61850-89, IEC 61850-90, IEC 61850-91, IEC 61850-92, IEC 61850-93, IEC 61850-94, IEC 61850-95, IEC 61850-96, IEC 61850-97, IEC 61850-98, IEC 61850-99, IEC 61850-100	UL C1/D2, IEC 61850-3, IEC 61850-4, IEC 61850-5, IEC 61850-6, IEC 61850-7, IEC 61850-8, IEC 61850-9, IEC 61850-10, IEC 61850-11, IEC 61850-12, IEC 61850-13, IEC 61850-14, IEC 61850-15, IEC 61850-16, IEC 61850-17, IEC 61850-18, IEC 61850-19, IEC 61850-20, IEC 61850-21, IEC 61850-22, IEC 61850-23, IEC 61850-24, IEC 61850-25, IEC 61850-26, IEC 61850-27, IEC 61850-28, IEC 61850-29, IEC 61850-30, IEC 61850-31, IEC 61850-32, IEC 61850-33, IEC 61850-34, IEC 61850-35, IEC 61850-36, IEC 61850-37, IEC 61850-38, IEC 61850-39, IEC 61850-40, IEC 61850-41, IEC 61850-42, IEC 61850-43, IEC 61850-44, IEC 61850-45, IEC 61850-46, IEC 61850-47, IEC 61850-48, IEC 61850-49, IEC 61850-50, IEC 61850-51, IEC 61850-52, IEC 61850-53, IEC 61850-54, IEC 61850-55, IEC 61850-56, IEC 61850-57, IEC 61850-58, IEC 61850-59, IEC 61850-60, IEC 61850-61, IEC 61850-62, IEC 61850-63, IEC 61850-64, IEC 61850-65, IEC 61850-66, IEC 61850-67, IEC 61850-68, IEC 61850-69, IEC 61850-70, IEC 61850-71, IEC 61850-72, IEC 61850-73, IEC 61850-74, IEC 61850-75, IEC 61850-76, IEC 61850-77, IEC 61850-78, IEC 61850-79, IEC 61850-80, IEC 61850-81, IEC 61850-82, IEC 61850-83, IEC 61850-84, IEC 61850-85, IEC 61850-86, IEC 61850-87, IEC 61850-88, IEC 61850-89, IEC 61850-90, IEC 61850-91, IEC 61850-92, IEC 61850-93, IEC 61850-94, IEC 61850-95, IEC 61850-96, IEC 61850-97, IEC 61850-98, IEC 61850-99, IEC 61850-100
Industrial Rating	Heavy-duty Industrial applications						
Isolation	2.0 kV						
Isolated Lines	Input, Output			Input, Output, Power			
ESD Protection	8 kV			15 kV air			
Baud Rate, max.	115.2 kbps	230.4 kbps	115.2 kbps				
RS-232 Connectors	DB9 female (DTE) DB9 male (DCE)	DB9 female (DCE) DB9 male (DTE)	Terminal block	DB9 female (DCE) DB9 male (DTE)			
Signal Range, meters	15 m		30 m				
Power Input	5 Vdc	12 Vdc	10 to 30 Vdc	10 to 48 Vdc			
Power Source	Port powered		External PSU (required)				
Power Connector	-	2.5 mm jack	Terminal block				
Operating Temperature	0 to +70 °C		-40 to +80 °C				
Enclosure	Plastic	IP30 plastic			IP30 metal		
Dimensions, mm	61 x 33 x 17 mm	104 x 43 x 20 mm	25 x 79 x 95 mm	123 x 113 x 32 mm	132 x 93 x 33 mm		
Mounting Installation	In-line		DIN rail, Panel mount option	DIN rail	Panel mount, DIN rail option		
MTBF (MIL217F), hours	674717	262084	244689	177250	194712		
Regulatory/Approvals/ Certifications	FCC, CE						
	EMC: EN 55011:2016+A2:2021 Class A Group 1 BS EN 55011:2016+A2:2021 Class A Group 1 CISPR 11:2015+AMD1:2016+AMD2:2019 Ed 6.2 Class A Group 1 EN 55032:2015+A1:2020 Class A / BS EN 55032:2015+A1:2020 Class A CISPR 32:2015+AMD1:2019 Class A EN IEC 61000-6-4:2019 / BS EN IEC 61000-6-4:2019 EN 55035:2017+A11:2020 / BS EN 55035:2017+A11:2020 EN IEC 61000-6-2:2019 / BS EN IEC 61000-6-2:2019 EN 61000-4-2:2009 / EN IEC 61000-4-3:2020 / EN 61000-4-8:2010	EMC: EN 55032 Class A EN 55024 EN 61000-6-1 Reduction of Hazardous Substances Directive (RoHS) Waste Electrical & Electronic Equipment (WEEE)	EMC: EN 55011:2016+A2:2021 Class A Group 1 BS EN 55011:2016+A2:2021 Class A Group 1 CISPR 11:2015+AMD1:2016+AMD2:2019 Ed 6.2 Class A Group 1 EN 55032:2015+A1:2020 Class A / BS EN 55032:2015+A1:2020 Class A CISPR 32:2015+AMD1:2019 Class A EN IEC 61000-6-4:2019 / BS EN IEC 61000-6-4:2019 EN 55035:2017+A11:2020 / BS EN 55035:2017+A11:2020 EN IEC 61000-6-2:2019 / BS EN IEC 61000-6-2:2019 EN 61000-4-2:2009 / EN IEC 61000-4-3:2020 / EN 61000-4-8:2010	EMC: EN 55032 Class A EN 55024 EN 61000-6-1 Reduction of Hazardous Substances Directive (RoHS) Waste Electrical & Electronic Equipment (WEEE)	EMC: EN 55011:2016+A2:2021 Class A Group 1 BS EN 55011:2016+A2:2021 Class A Group 1 CISPR 11:2015+AMD1:2016+AMD2:2019 Ed 6.2 Class A Group 1 EN 55032:2015+A1:2020 Class A / BS EN 55032:2015+A1:2020 Class A CISPR 32:2015+AMD1:2019 Class A EN IEC 61000-6-4:2019 / BS EN IEC 61000-6-4:2019 EN 55035:2017+A11:2020 / BS EN 55035:2017+A11:2020 EN IEC 61000-6-2:2019 / BS EN IEC 61000-6-2:2019 EN 61000-4-2:2009 / EN IEC 61000-4-3:2020 / EN 61000-4-8:2010		
	FCC (Part 15, CISPR), UL 508 #E222870, EN55032 B, EN55024, EN55032+ AC	UL 508 #E222870, EN55032 B, EN55024, EN61000-6-1	UL Recognized #E222870, KCC, EN55032 B, EN55024	UL C1/D2 #E245458*, UL 508 #E222870, EN55032 B, EN 55024, EN61000-6-2	UL C1/D2 #E245458*, IEC61850-3†, IEC61850-4‡, EN55032/A, EN55024, EN55011/AC, EN61000-6-2		



*UL C1/D2 #E245458

†IEC61850-3

‡IEEE-1613