ULI-234TCL BB-485OP

Optically Isolated RS-422/485 Repeater/Extender

Features

- 1.2 km signal extension
- 2 kV optical isolation for device and data lines
- Add up to 32 nodes to RS-485 network
- Inline installation
- Modbus support
- External 12 Vdc power source required (included)

Introduction

Model ULI-234TCL is an RS-422/485 signal repeater with 2 kV optical isolation on data lines and terminal blocks for RS-422, RS-485 2 or 4-wire modes. It extends RS-422/485 an additional 1.2 km to double the communication range. Another benefit is the ability to add another 32 nodes to an RS-485 network and join 2 and 4 wire systems. Its compact design fits almost anywhere. Wiring schematic on the label eliminates guesswork. 12 Vdc PSU is required and included with USA, EU, UK, AU, UP and CN blades.

Specifications

Serial Technology

- **Connector** Terminal block
- **Signals** TDA(-), TDB(+), RDA(-), RDB(+), GND
- **Modes** RS-485 2-wire or 4-wire, RS-422 4-wire
- **LED Indicators** Data flow and Power

Isolation

- **Method** Optical
- **Rating** 2000 V
- **Lines Protected** Data lines

Surge Suppression

- **Method** TVS
- **Rating** 6.5 V, bi-directional, 600W peak power dissipation
- **Lines Protected** Data lines

Industrial Bus

- **Protocol** Modbus ASCII / RTU

Terminal Block

- **Wire Size** 22 to 14 AWG
- **Torque** 0.5 Nm

Power

- **Connector** Terminal block
- **Voltage** 10 ~ 14 Vdc
- **Consumption** 1.0 W
- **Source** External 12 Vdc source, required.
  Note: one wall transformer power supply included.

Power Supply, included

- **Input Voltage** 96 ~ 264 Vac
- **Input Connections** AC blades for USA, EU, UK, AU, CN, JP
- **Output Connections** Stripped and tinned leads
- **Output Current** 500 mA
- **Output Power** 6 W
- **Output Voltage** 12 Vdc
- **Efficiency Level** VI

Mechanical

- **Enclosure Material** Plastic
- **IP Rating** 30
- **Dimensions** 97 x 61 x 25 mm
- **Mounting** In-line installation

Environmental

- **Operating Temperature** 0 to +40 °C
- **Operating Humidity** 0 to 95%, non-condensing

Meantime Between Failures (MTBF)

- **MTBF, hours** 453103
- **Calculation Method** MIL217F Parts Count Reliability Prediction

Regulatory Certifications

- **Approvals** FCC
- **CE Directives** 2014/30/EU – Electromagnetic Compatibility Directive
  2011/65/EU – Amended by (EU) 2015/863 Reduction of Hazardous Substances Directive (RoHS)
  2012/19/EU – Waste Electrical and Electronic Equipment

CE Standards EN 55032 (Class B) – Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements
EN 55024 – Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement
EN 60950-1 +A1 +A11 +A12 +A2 – Information Technology Equipment – Safety – Part 1 General Requirements

Ordering Information

Model	Part Number to Order	Description
ULI-234TCL	BB-485OP	Industrial Isolated RS-422/485 Repeater

Last updated: 24-Apr-2023

ULI-234TC
ULI-234TCH
ULI-234TCI
ULI-234TE

BB-485OPDR
BB-485OPDR-HS
BB-485OPDRI
BB-485OPDRI-PH

Industrial-grade, Isolated RS-422/485 Repeaters

Features

- Extend RS-422/RS-485 signals an extra 1.2 km
- Add up to 32 more nodes to RS-485 network
- 2 kV optical isolation protection
- 600 W transient voltage suppression
- Industrial-grade design, specifications and certifications
- Industrial protocol support
- Wide operating temperature options
- DIN rail, panel mount or in-line installation
- External PSU required

Introduction

These rugged isolated repeaters from Advantech are ideal for demanding industrial applications. Heavy-duty repeaters can be DIN rail mounted in a cabinet or directly to a panel. Advanced EMC specifications support 2 kV isolation on input and output lines. Models ULI-234TCI and ULI-234TE protect input and output lines plus the power line providing triple protection against electrical transients. Model ULI-234TE is a premium performance repeater for electical substation and other advanced applications.

Specifications

Serial Technology

- **Data Rate, Biasing, Termination**

Model:	Data Rate (max):	Biasing:	Termination:
ULI-234TC	115.2 kbps	-	-
ULI-234TCH	1.5 Mbps		
ULI-234TCI	115.2 kbps	Built-in, switchable, 1.2KΩ, TX/RX	Built-in, switchable, 120Ω
ULI-234TE			

- **LED Indicators** Data flow, Power
- **RS-422/485 Connector** Terminal block
- **RS-422/485 Signals** TDA(-), TDB(+), RDA(-), RDB(+), GND
- **RS-422/485 Modes** RS-485 2-wire or 4-wire, RS-422 4-wire
- **Industrial Bus**

Model:	Industrial Protocol:
ULI-234TC	Modbus ASCII / RTU
ULI-234TCH	
ULI-234TCI	Allen-Bradley® 1747-AIC 485 (DH-485), Modbus ASCII / RTU
ULI-234TE	Modbus ASCII / RTU

Isolation & Surge Suppression

Model:	Optical Isolation:	Isolated Lines:	Surge Suppression:	Surge Rating:
ULI-234TC	2 kV	Input, output	500 W, TVS	6.5V bi-directional avalanche breakdown device, 500W peak power dissipation, <1 psec, response time
ULI-234TCH			600 W, TVS	12V bi-directional avalanche breakdown device. 600 W peak power dissipation, < 1 psec respones time
ULI-234TCI		Input, output, power		
ULI-234TE				

Power

Model:	Connector:	Input:	Source:	Consumption:
ULI-234TC	Terminal block	10 to 30 Vdc	External, not included	0.7 W
ULI-234TCH				1.9 W
ULI-234TCI		10 to 48 Vdc		0.5 W
ULI-234TE				0.5 W

Mechanical

Model:	Enclosure:	Dimensions, mm:	Mounting:	Weight, gm
ULI-234TC	IP20 plastic	25 x 79 x 106	DIN rail, panel mount option	90.72
ULI-234TCH		25 x 79 x 95		
ULI-234TCI		115.1 x 89.6 x 32.1	DIN rail	222.0
ULI-234TE	IP30 metal	132 x 93 x 31	Panel mount	208.65

Meantime Between Failures (MTBF)

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

Model:	Hours:
ULI-234TC	225299
ULI-234TCH	117376
ULI-234TCI	114696
ULI-234TE	122832

Environmental

Model:	Operating Temperature:	Storage Temperature:	Operating Humidity:
ULI-234TC	-40 to +80 °C	-40 to +85 °C	0 to 95%, non-condensing
ULI-234TCH			
ULI-234TCI			
ULI-234TE	-40 to +85 °C		

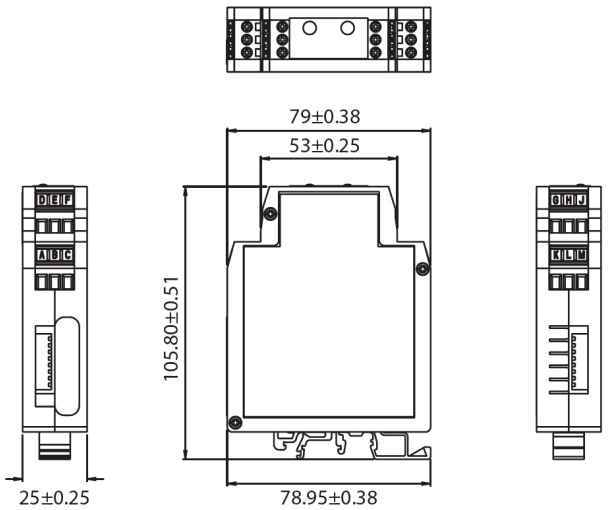
Regulatory / Approvals / Certifications

- FCC, CE (all models)

Model:	CE Standards	CE Directives	Other Standards
ULI-234TC	2014/30/EU – Electromagnetic Compatibility Directive (ECM) 2011/65/EU – Amended by (EU) 2015/863 Reduction of Hazardous Substances Directive (RoHS) 2012/19/EU – Waste Electrical and Electronic Equipment (WEEE)	EN 55032 Class A – Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements EN 55024 – Information Technology Equipment – Immunity Characteristics - Limits and Methods of Measurement EN 61000-6-1 – Generic Immunity Standard for Residential, Commercial and Light-industrial Environments	KCC, UL Recognized Component #E222870
ULI-234TCH			CISPR Class B (EN 55032) EN 61000-6-2 (Heavy Industrial) IEC 60068-2-27 (Shock) 15G Peak, 11 ms, 3 axes IEC 60068-2-6 (Vibration) 140-500 Hz, 1G, 3 axes IEC 60068-2-32 (Drop) 10 total drops from sides, corner, edges
ULI-234TCI		EN 55032 Class B – Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements EN 55024 – Information Technology Equipment EN 61000-6-1 – Generic Immunity Standard for Residential, Commercial and Light-industrial Environments	UL C1/D2 #E245458, Groups A,B,C,D
ULI-234TE		EN 55032 Class A – Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements EN 55024 – Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement	UL C1/D2 #E24545, IEC-61850-3, IEEE-1613 EN 55011 + AC – Information Technology Equipment - Class A RF Emissions EN 61000-6-2 – Generic Immunity Standard for (Heavy) Industrial Environments

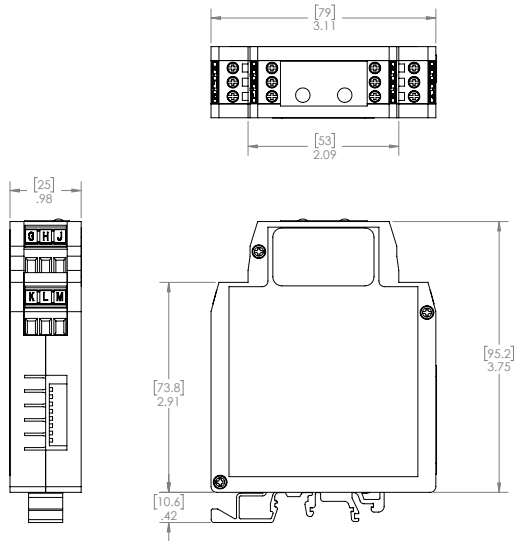
Dimensions - ULI-234TC

Unit = mm



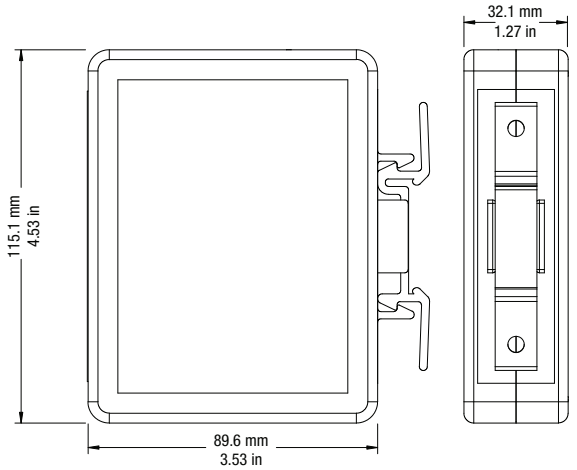
Dimensions - ULI-234TCH

Unit = mm / in



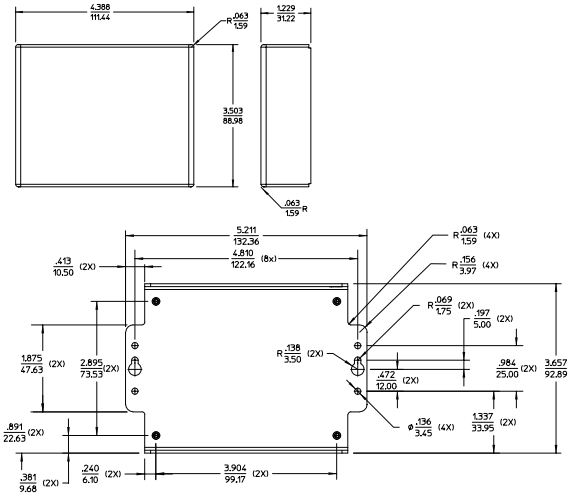
Dimensions - ULI-234TCI

Unit = mm / in



Dimensions - ULI-234TE

Unit = in / mm

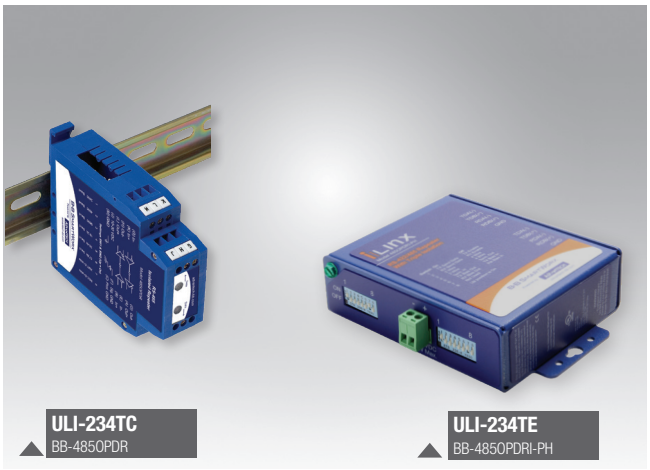


Ordering Information

Model	Part Number to Order	Description
ULI-234TC	BB-485OPDR	Industrial Isolated RS-422/485 Repeater – 2 kV 2-way Isolated, 115.2 kbps, wide operating temperature range. *PSU not included.*
ULI-234TCH	BB-485OPDR-HS	Industrial Isolated RS-422/485 Repeater – 2 kV 2-way Isolated, 1.5 Mbps, wide operating temperature range. *PSU not included.*
ULI-234TCI	BB-485OPDRI	Industrial Isolated RS-422/485 Repeater – 3 kV 2-way Isolated, 115.2 kbps, wide operating temperature range. *PSU not included.*
ULI-234TCE	BB-485OPDRI-PH	Industrial Isolated RS-422/485 Repeater – 3 kV 2-way Isolated, 115.2 kbps, wide operating temperature range. *PSU not included.*

ULI-234 Series Selection Guide

Industrial Heavy-duty, Isolated RS-422/485 Repeaters



ULI-234TC
BB-485OPDR

ULI-234TE
BB-485OPDRI-PH

Common Features

- Extend RS-422/RS-485 signals an extra 1.2 km
- Add up to 32 more nodes to RS-485 network
- 2 kV optical isolation protection
- 600 W transient voltage suppression
- Industrial-grade design, specifications and certifications
- Industrial protocol support
- Wide operating temperature options
- External powering (PSU required, sold separately)
- DIN rail, panel mount or in-line installation

Serial Converters Comparison Table

Model Number	ULI-234TCL	ULI-234TC	ULI-234TCH	ULI-234TCI	ULI-234TE
Part Number to Order	BB-485OP	BB-485OPDR	BB-485OPDR-HS	BB-485OPDRI	BB-485OPDRI-PH
Description	2-way Isolated RS-422/485 Repeaters			3-way Isolated RS-422/485 Repeater – A-B® 1747-AIC DH-485	Hardened, 3-way Isolated RS-422/485 Repeater – shock, drop, vibration tested
Key Features	Two terminal blocks join 2-wire and 4-wire systems	UL Recognized Component	1.5 Mbps, high-speed	UL C1/D2, UL 508, 3-way Isolation, Oil & Gas applications	UL C1/D2, IEC61850-3, IEEE-1613, 3-way Isolation, Electrical substations
Industrial Rating	Heavy-duty				
Isolation	2 kV, input/output			2 kV, input/output/power	
Surge Protection	600 W, TVS	500 W, TVS	600 W, TVS		
Industrial Bus	Modbus ASCII / RTU			Allen-Bradley® 1747-AIC 485 (DH-485), Modbus ASCII / RTU	Modbus ASCII / RTU
Baud Rate, max.	115.2 kbps		1.5 Mbps	115.2 kbps	
RS-422/485 Connector	Terminal block				
Automatic Send Data Control	✓	✓	✓	–	
Power Input	10 to 14 Vdc	10 to 30 Vdc		10 to 48 Vdc	
Power Source	External PSU				
Power Connector	Terminal block				
Operating Temperature	0 to +40 °C	-40 to +80 °C			-40 to +85 °C
Enclosure	IP30 plastic	IP20 plastic			IP30 metal
Dimensions	97 x 61 x 25 mm	25 x 79 x 106 mm	25 x 79 x 95 mm	115.1 x 89.6 x 32.1 mm	132 x 93 x 33 mm
Mounting Installation	In-line	DIN rail	DIN rail, panel mount option	DIN rail	Panel mount
MTBF (MIL217F), hours	453103	225299	117376	114696	122832
Regulatory/Approvals/ Certifications	FCC, CE				
	EN55032, EN55024, EN-60950-1+A1+A12+A2	UL Recognized Component #E222870, KCC, EN55032/A, EN55024, EN61000-6-1	EN55032/A, EN55024, EN61000-6-1, EN61000-6-2, IEC60068-2-27,-6,-32	**UL C1/D2 #E245458*,** UL 508 #E222870, EN55032/B, EN55024, EN61000-6-1	**UL C1/D2 #E245458*, IEC61850-3†, IEEE-1613‡,** EN55032/A, EN55024, EN55011/AC, EN61000-6-2

*UL C1/D2 #E245458 †IEC61850-3 ‡IEEE-1613

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