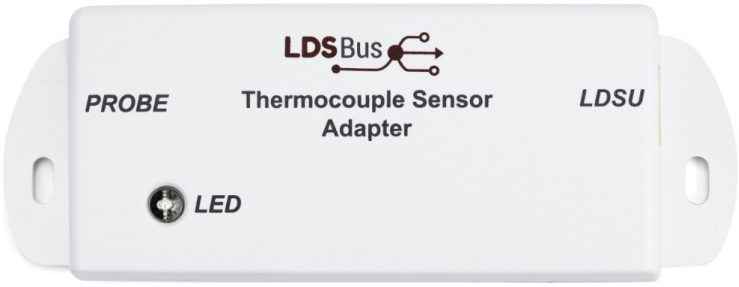
Thermocouple Sensor Adapter Datasheet



1 Introduction

The LDSBus Thermocouple Sensor Adapter is designed to operate with any K-type thermocouple probe and provides temperature measurements ranging between -200°C to 1372°C with an accuracy of ±0.5°C. The adapter automatically handles all the necessary signal conditioning and analog to digital conversions to produce linearized temperature readings at high report rates. The LDSBus Thermocouple Sensor Adapter may be used in applications such as food production, metal extruders, furnaces, cryogenic baths, and freezers to name a few.

1.1 Features

- Thermocouple Sensor Adapter connects with any K-type Thermocouple probe
- Measures temperature in the range of -200°C to 1372°C with an accuracy of ±0.5°C
- Automatic cold junction compensation and linearization for high accuracy readings
- Supports BRTSys LDSBus protocol
- Low power consumption 85mW at 5V
- High report rate of 1 report every 5 seconds
- Operating temperature range: 0°C to +70°C
- Flush mount and DIN Rail Mount options
- Supported platforms:
  - IoTPortal
  - LDSBus Python SDK
  - LDSBus .Net SDK

Visit https://brtsys.com/resources for more information.

2 Part Numbers / Ordering Information

Part#	Description
LS-0301-01A	LDSBus Thermocouple Sensor Adapter
LA-0501-01A	LDSBus RJ11-RJ11 Cable (5m)
LA-1201-01A	LDSBus DIN Rail Mount Set

Table 1 - Part Numbers / Ordering Information

Table of Contents

3 Specifications

Features	Interface	K-type connector (connect to K-type probe), RS485
	LED Indicator (RGB)	System Status Indicator (Please refer to LED section)
	Mounting	Flush Mount
		DIN-Rail Mount
Power	Input Voltage	5V DC Bus Power
	Typical Power	85mW
	Max. Power	320mW
Thermocouple Sensor input module	Range	-200°C to +1372°C
	Accuracy	±0.5C
	Resolution	0.0625°C/ 0.25°C (Configurable)
	Response Time	<3 seconds
	Thermocouple Type	Type-K
Physical Characteristics	Color	White
	Housing	Polycarbonate
	Dimensions	L117.6mm x W42.9mm x H29.7mm
Environmental Limits	Operating Temperature	0 to 70°C
	Storage Temperature	-20 to 85°C
	Ambient Relative Humidity	5 to 95% (non-condensing)
Package Contents	Device	1x LDSBus Thermocouple Sensor Adapter
	Wire Assembly	1x LDSBus RJ11-RJ11 Cable (5m)
Optional	Mounting Accessories	1x LDSBus DIN Rail Mount set

Table 2 - LDSBus Thermocouple Sensor Adapter Specifications

4 FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) These devices may not cause harmful interference, and
(2) These devices must accept any interference received, including interference that may cause undesired operation.

NOTE: The equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF exposure guidelines, at least 20cm of separation distance between the device and the user's body must be always maintained.

FCC Radiation Exposure Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and consider removing the no-collocation statement.

Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

5 Hardware Features

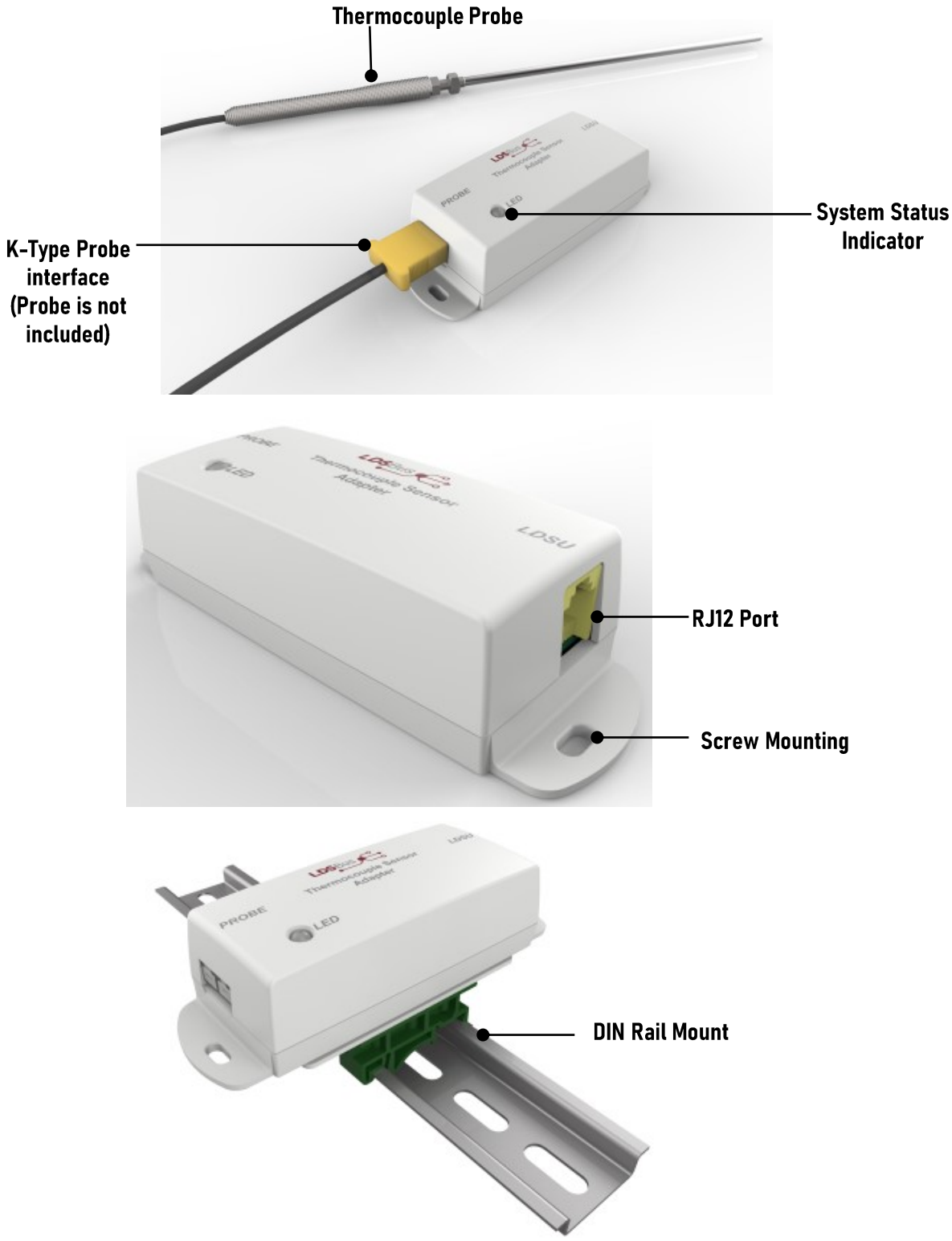


Figure 1 – LDSBus Thermocouple Sensor Adapter - Hardware Features

Function	Labels	Description
K-Type Probe Interface	Probe	Probe Interface
Thermocouple Probe	-	Sensing Probe
System Status LED Indicator	LED	LDSBus status LED
RJ12 Port	LDSU	LDSBus data and power interface port. The physical port is RJ12. The connection interface can be RJ11/RJ12.

Table 3 - LDSBus Thermocouple Sensor Adapter Hardware Features

6 Sensor Adapter Configuration and Installation

Please refer to LDSBus Configuration Utility User Guide on how to configure the device name, address, and termination settings before using it for your application.

6.1 Connection Diagram

Figure 2 illustrates the connection of the LDSBus Thermocouple Sensor Adapter (LDSBus Device) to the LDSBus. Please visit https://brtsys.com/resources to view the full device application, setup, and installation guides.

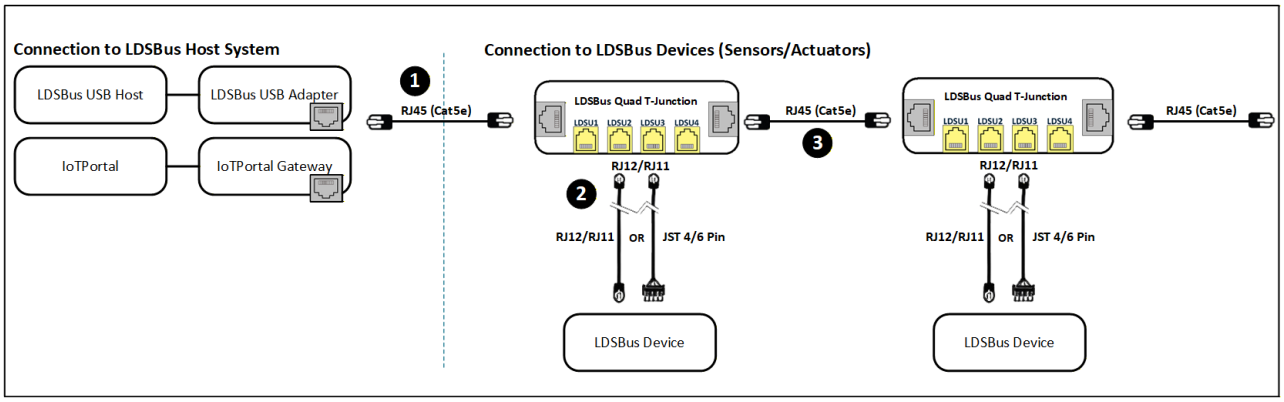


Figure 2 - LDSBus Thermocouple Sensor Adapter - Connection Diagram

Setup Instructions:

1. Connect the first LDSBus Quad T-Junction to any of the LDSBus Host Systems using the RJ45 (CAT5e) cable as show in Figure 2.

2. Connect the configured LDSBus Thermocouple Sensor Adapter to the LDSBus Quad T-Junction as shown in Figure 2.

3. If there are more than one LDSBus Quad T-Junctions, chain them together as shown in Figure 2.

   Enable termination for the last device in LDSBus.

7 Mounting Instructions

7.1 Flush Mount

The device can be flush mounted directly on a wall or any flat surface using 2 M3.5*16mm (thread) screws.

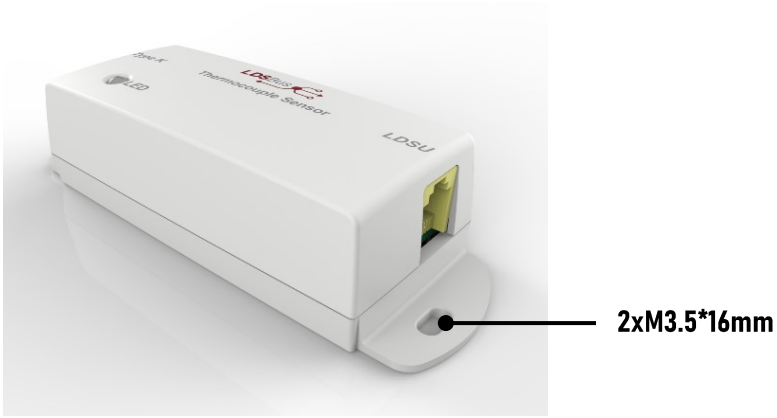


Figure 3 - LDSBus Thermocouple Sensor Adapter Flush Mount

7.2 DIN Rail Mount

The LDSBus Thermocouple Sensor can be mounted on a DIN Rail using the LDSBus DIN Rail Mount set. This set is optional and includes the bracket and mounting screws.

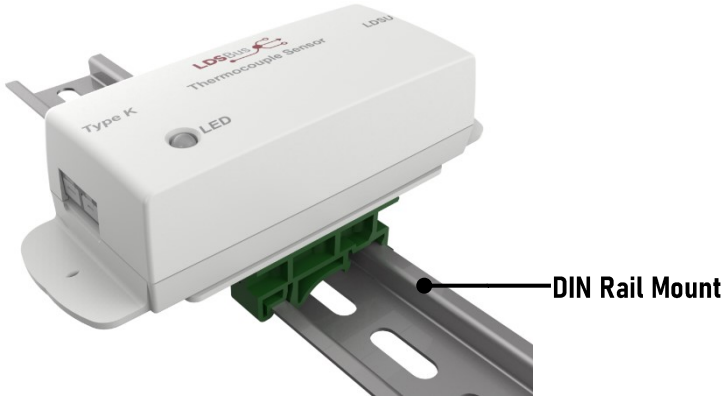


Figure 4 – LDSBus Thermocouple Sensor Adapter DIN Rail Mount

8 Mechanical Dimensions

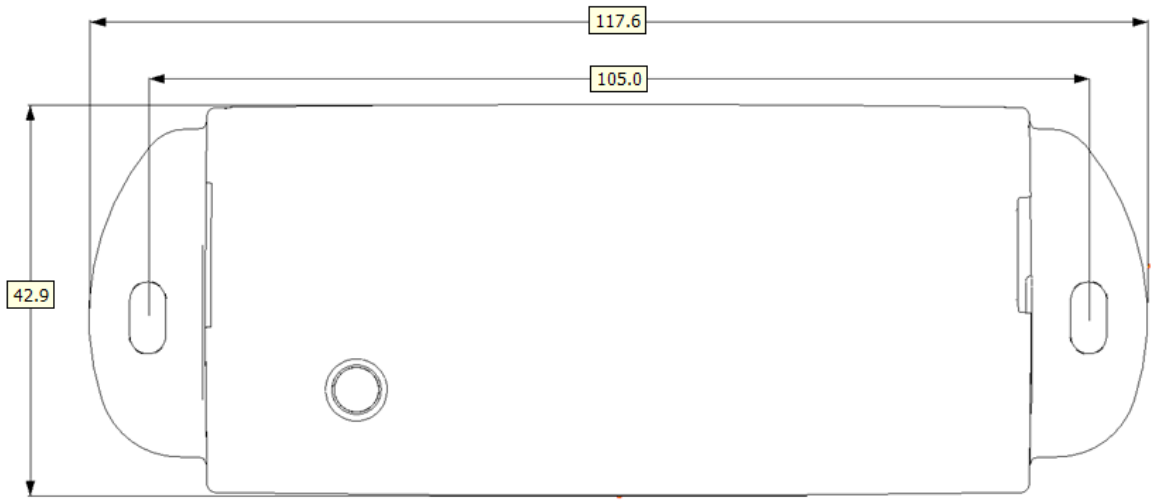


Figure 5 – LDSBUS Thermocouple Sensor Adapter Dimension – Top View

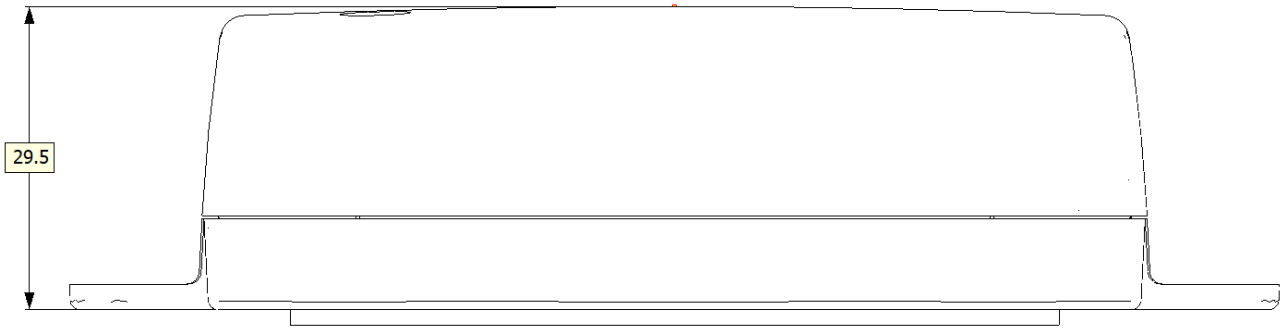


Figure 6 – LDSBUS Thermocouple Sensor Adapter Dimension – Side View

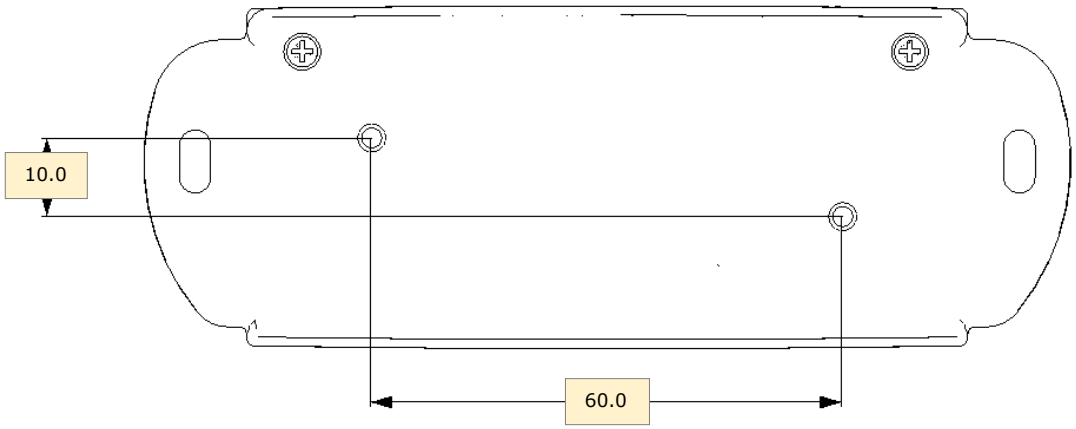


Figure 7 – LDSBUS Thermocouple Sensor Adapter Dimension – Bottom View

Note: All dimensions are in millimetres.

9 System Status LED Indicators

LDSU devices come with a tri-color LED, and LED status colors are mentioned in the table below.

Status display colors:

1. RED - Device in error conditions
2. YELLOW - Un-configured device
3. GREEN - Device in normal state (Device termination is OFF)
4. BLUE - Device in normal state (Device termination is ON)

Device Status	LED Color		Flashing Frequency	Description
Un-configured device	YELLOW		LED flashing @1Hz	Un-configured device with factory default address (126)
Configured device	GREEN		Steady – Non-flashing	Configured device (Device ID 1-125) and device is idle.
	BLUE			
Addressed device	GREEN		LED flashing @5Hz	Device is busy communicating.
	BLUE			
Identified device	GREEN		LED flashing @1Hz	Device in identify state.
	BLUE			
Device error	RED		Steady – Non-flashing	Device error has occurred.
Firmware update	YELLOW		Steady – Non-flashing	Device firmware update.

Table 4 – System Status LED Indicators

10 Type-K Plug Interface Probe Standard

Table 5 provides a list of Type K Plugs to terminate Type K thermocouple probes for connection to LDSBus Thermocouple Sensor Adapter.

'+' Contact	'-' Contact	IEC Miniature		ANSI Miniature		JIS Miniature	
		Color	Green	Color	Yellow	Color	Blue
Nickel Chromium	Nickel Alloy						

Table 5 - Type-K Plugs Interface

For information related to probes recommendation and selection criteria, please refer to 3rd Party Compatible Probes Specifications.

11 Contact Information

Refer to https://brtsys.com/contact-us/ for contact information.

Appendix A – References

Document References

LDSBus Configuration Utility User Guide

LDSBus Python SDK V3.0.0 Guide

LDSBus .Net SDK V3.0.0 Guide

3rd Party Compatible Probes Specifications

Sensors and Actuators Quick Start Guide for USB Hosts

Sensors and Actuators Quick Start Guide for IoTPortal

Acronyms and Abbreviations

Terms	Description
DC	Direct Current
IoT	Internet of Things
LED	Light Emitting Diode

Appendix B – List of Figures and Tables

List of Figures

List of Tables

Appendix C – Revision History

Document Title: LDSBus Thermocouple Sensor Datasheet

Document Reference No.: BRTSYS_000005

Clearance No.: BRTSYS#013

Product Page: https://brtsys.com/product/thermocouple-sensor-adapter/

Document Feedback: Send Feedback

Revision	Changes	Date
Version 1.0	Initial Release	18-11-2021
Version 1.1	Updated release under BRT Systems	15-09-2022
Version 1.2	Corrected BRTSYS to BRTSys	24-03-2023
Version 1.3	Updated the following – HVT references to Quad T-Junction; Singapore address	11-09-2023
Version 1.4	Section 1.1 - Added .Net SDK to Supported platforms; ROHS icon added Section 2 - Added LA-0501-01A in part number Section 3 - Updated "Wire Assembly" Section 4 – Added FCC statement Section 5 - Added Table 3; Updated Figure 1 (Changed from "RJ11" to RJ12" for LDSU port) Appendix A – References > Document References – updated	23-01-2026