



# LDSBus 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  $-200^{\circ}\text{C}$  to  $1372^{\circ}\text{C}$  with an accuracy of  $\pm 0.5^{\circ}\text{C}$ . The adapter automatically handles all the necessary signal conditioning and analog to digital conversions to produce linearized temperature readings and can sustain 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  $-200^{\circ}\text{C}$  to  $1372^{\circ}\text{C}$  with an accuracy of  $\pm 0.5^{\circ}\text{C}$
- Automatic cold junction compensation and linearization for high accuracy readings
- BRTSys's LDSBus protocol. Wired data/power transmission through LDSBus HVT-Junction
- Low power consumption 5V, 85mW
- High report rate of 1 report every 5 seconds
- Operating temperature range:  $0^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$
- Flush mount and DIN Rail Mount options
- Supported platform application: BRTSys's IoTPortal and LDSBus Python SDK (Visit <https://brtsys.com/resources>)



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## 2 Part Numbers

| <b>Part#</b> | <b>Naming</b>                      |
|--------------|------------------------------------|
| LS030101A    | LDSBus Thermocouple Sensor Adapter |
| LA120101A    | LDSBus DIN Rail Mount Set          |

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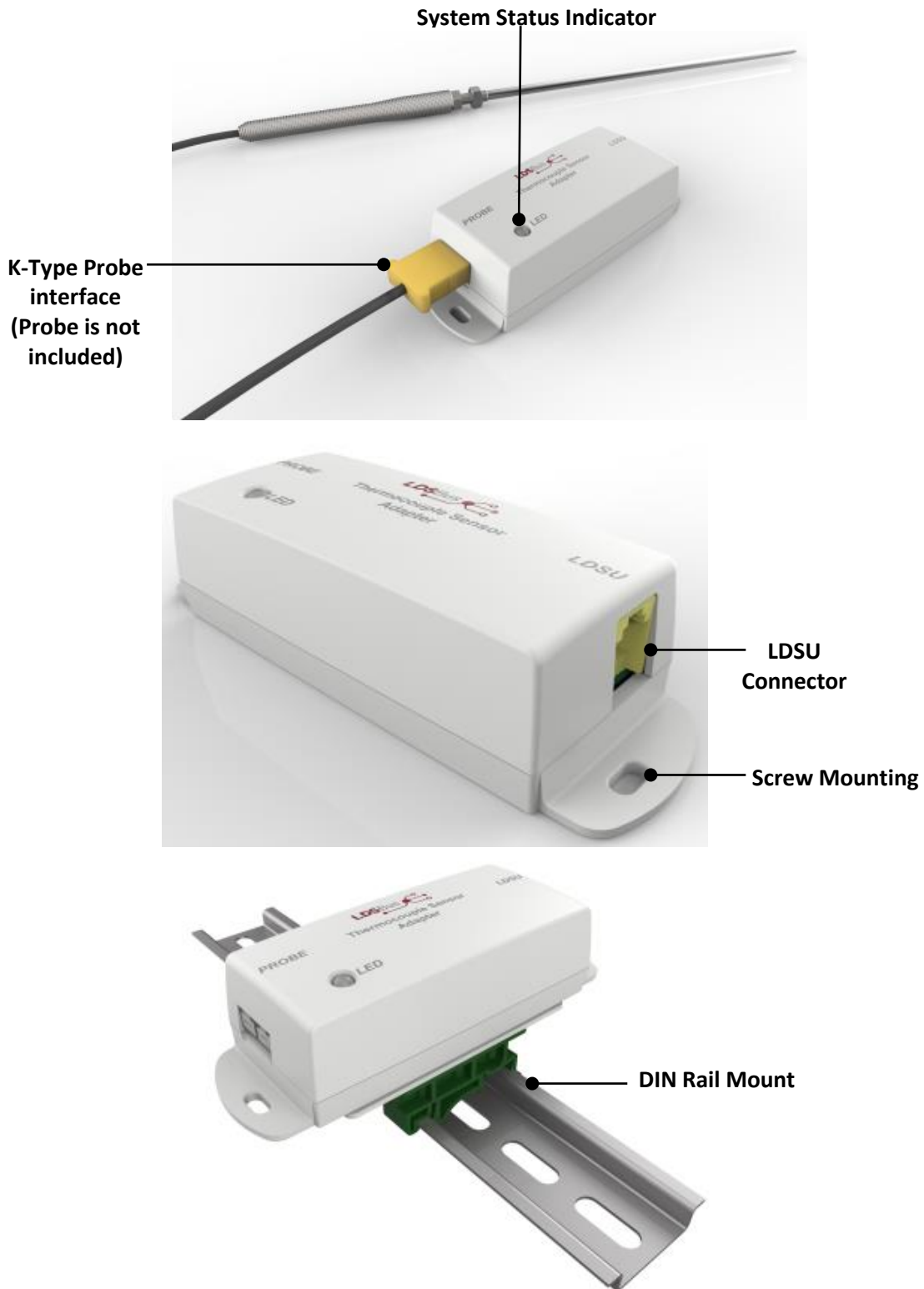
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### 3 Product Specifications

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

**Table 1 - LDSBus Thermocouple Sensor Adapter Specifications**

## 4 Hardware Features



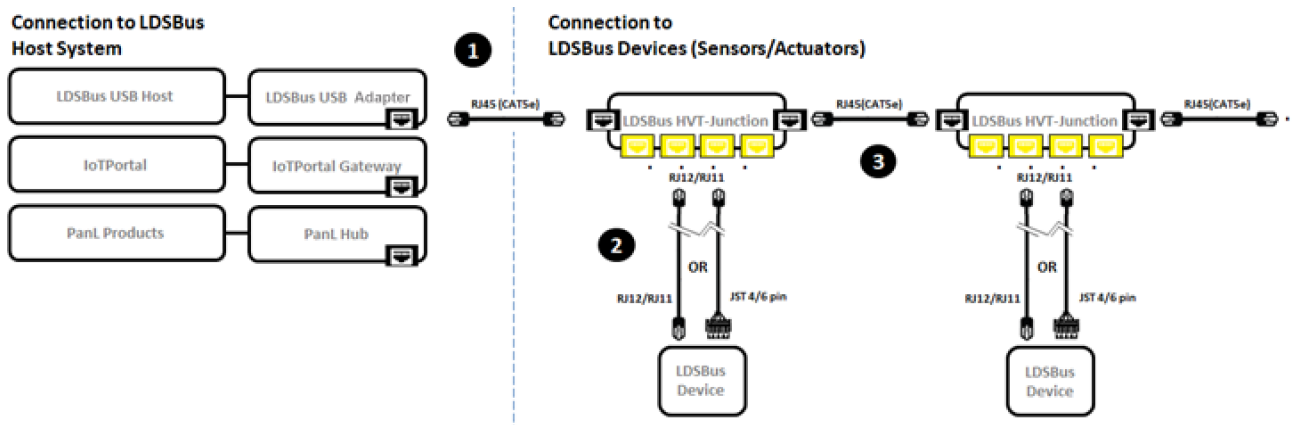
**Figure 1 – LDSBus Thermocouple Sensor Adapter - Hardware Features**

## 5 Sensor Configuration and Installation

Please visit <https://brtsys.com/resources> to access the LDSBus Configuration Utility Guide on how to configure the device name, address, and termination settings before using it for your application.

### 5.1 Connection Diagram

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



**Figure 2 - LDSBus Thermocouple Sensor Adapter - Connection Diagram**

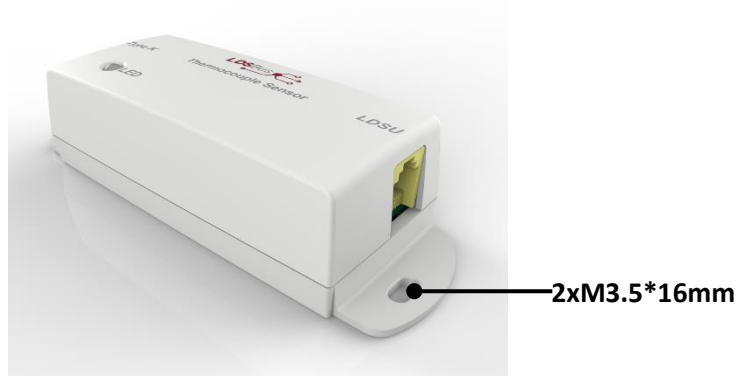
#### **Setup Instructions:**

1. Connect the first LDSBus HVT-Junction to any of the LDSBus Host Systems using the RJ45 (CAT5e) cable.
2. Connect the configured LDSBus Thermocouple Sensor Adapter to the LDSBus HVT-Junction as shown in Figure 2.
3. If there is more than one LDSBus HVT-Junction, chain them together as shown in Figure 2.

## 6 Mounting Options

### 6.1 Flush Mount

The LDSBus Thermocouple Sensor 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**

### 6.2 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**

## 7 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 2 – LDSBus Thermocouple Sensor Adapter – System Status LED Indicator**



## 8 Type-K Plug Interface Probe Standard

Table 3 provides a list of Type K Plugs to terminate Type K thermocouple probes for connection to LDSBus Thermocouple Sensor Adapter.

| `+'<br>Contact  | `-'<br>Contact | IEC Miniature   |       | ANSI Miniature   |        | JIS Miniature   |      |
|-----------------|----------------|---|-------|--|--------|---|------|
|                 |                | Color   | Green | Color  | Yellow | Color   | Blue |
| Nickel Chromium | Nickel Alloy   |  |       |  |        |  |      |

**Table 3 - Type-K Plugs Interface**

For information related to probes recommendation and selection criteria, please refer to <https://brtsys.com/application-notes/>.

## 9 Mechanical Dimensions

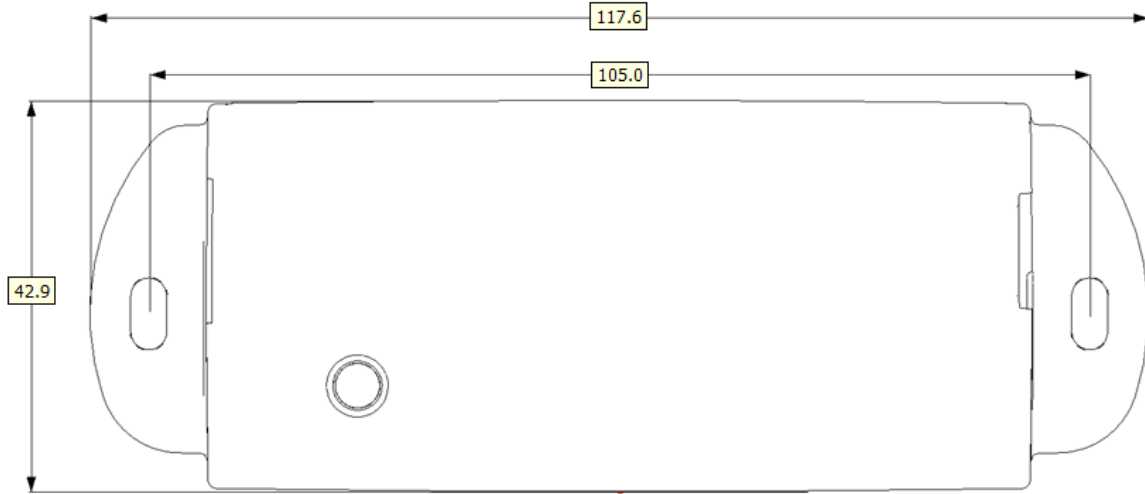


Figure 5 – LDSBUS Thermocouple Sensor Adapter Dimension – Top View

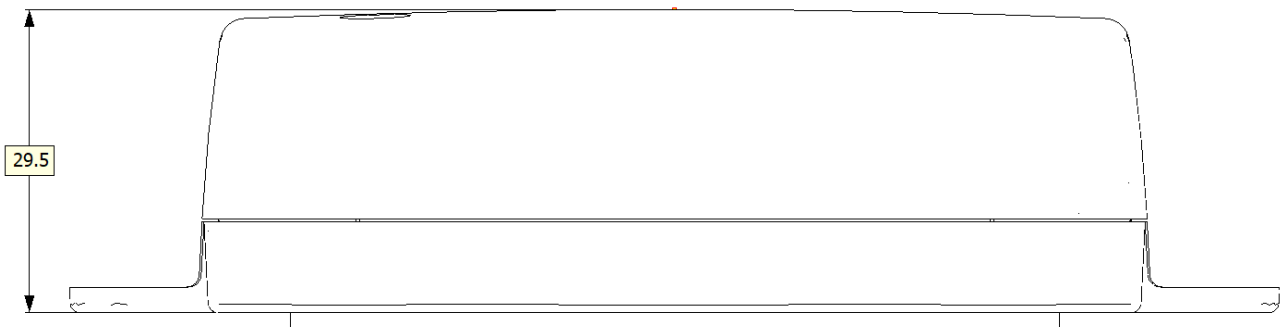


Figure 6 – LDSBUS Thermocouple Sensor Adapter Dimension – Side View

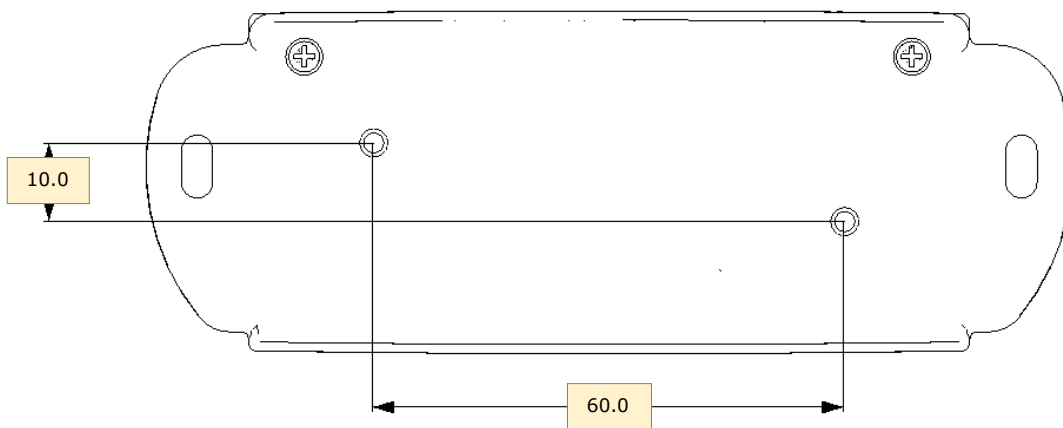


Figure 7 – LDSBUS Thermocouple Sensor Adapter Dimension – Bottom View

**Note:** All dimensions are in millimetres.

## 10 Contact Information

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## Appendix A – References

### Document References

[BRTSYS AN 001 LDSBus Configuration Utility User Guide](#)

[BRTSYS API 001 LDSBus Python SDK Guide](#)

[Sensor Actuator QSG](#)

### Acronyms and Abbreviations

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

## Appendix B – List of Figures and Tables

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## Appendix C – Revision History

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Document Reference No.: BRTSYS\_000005  
Clearance No.: BRTSYS#013  
Product Page: <https://brtsys.com/ldsbus>  
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 |