2CH Non-Latching Relay + iSENSE Datasheet

1 Introduction

LDSBus 2CH NL Relay and LDSBus 2CH NL Relay + iSENSE incorporate 2 relay controllers that have high load current handling capacity of 16A. These relays can switch both AC and DC loads. The LDSBus 2CH NL Relay + iSENSE version has 2 additional current sensors which can each monitor up to 20A of current. The unique non-latching feature of these relays are ideal in applications where relays have to switch back to their initial state for electrical safety.

The LDSBus 2CH NL Relay controllers are ideal for usage in forward and reverse motor control applications, switching on and off high-power loads and additionally perform load sensing simultaneously (iSENSE option).

1.1 Features

- 2 Channel single coil non-latching SPDT Relay
- Supports up to 16A load per relay channel
- Current sense monitoring up to ±20A (iSENSE option)
- Supports both AC (250V) and DC (300V) load switching
- Supports the BRTSys LDSBus protocol.
- Low power consumption
- Operating temperature range: 0°C to +55°C
- Flush mount and DIN Rail mounting options
- Supported Platforms:
  - PanL Smart Living
  - IoTPortal
  - LDSBus Python SDK
  - LDSBus .NET SDK

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

2 Part Numbers/Ordering Information

Part#	Description
LC-0113-01A	LDSBus 2CH NL Relay
LC-0103-01A	LDSBus 2CH NL Relay + iSENSE
LA-1201-01A	LDSBus DIN Rail Mount Set

Table 1 - Part Numbers/Ordering Information

Table of Contents

3 Specifications

Features	LDSU Interface	RS485
	System Status Indicator	1x RGB LED
	Relay Status Indicator	2x Red LEDs
	Power/Sensing Indicator*	1x Green LED
	Mounting	Flush Mount
		DIN Rail Mount
Power	Input Voltage	5V DC Bus Power
	Power (Relay+ iSENSE*)	Typ:834.3mW Max:972.8mW
	Power (Relay)	Typ:650.24mW Max:793.6mW
Relay	Number of Relay Channel	2
	Relay Type	SPDT, Dual Coil Non-Latching
	Contact arrangement	1 Form C SPDT-CO
	Rated voltage	≤ 250VAC
	Max. switching voltage	400VAC
	Rated current	16A
	Limiting continuous current	16A, UL:20A
	Mechanical endurance	>30x10^6 operations
	Max. DC load breaking capacity	Refer to Figure 1
	Electrical endurance	Refer to Figure 1
Current Sense*	Number of Current Channel	2
	Type of current for monitoring	AC/DC
	Primary current (Ipm)	-20A ~ 20A
	Measurable line frequency	50Hz/60Hz
	Resolution	0.2A
	Accuracy	Typ ±5% For 0A ~ ±2A, Accuracy typ ±0.2A
	Current Output Quiescent (No current flowing through IP)	-120mA ~ 120mA
	Thermal Offset Drift	Max: ±120mA; Referred to TA=25°C, IP = 0A
Physical Characteristics	Colour	White
	Housing	Polycarbonate
	Dimension	L138.2mm x W76.0mm x H31.9mm
Environmental Limits	Operating Temperature	0 to 55°C
	Storage Temperature	-20 to 85°C
	Ambient Relative Humidity	5 to 95% (non-condensing)
Package Contents	Device	1x LDSBus 2CH NL Relay / 1x LDSBus 2CH NL Relay + iSENSE
	Wire Assembly	1x 5m RJ11 Cable
Optional	Mounting Accessories	1x LDSBus DIN Rail Mount set

* Only for LDSBus 2CH NL Relay + iSENSE

Table 2 - LDSBus 2CH NL Relay / LDSBus 2CH NL Relay + iSENSE Specifications

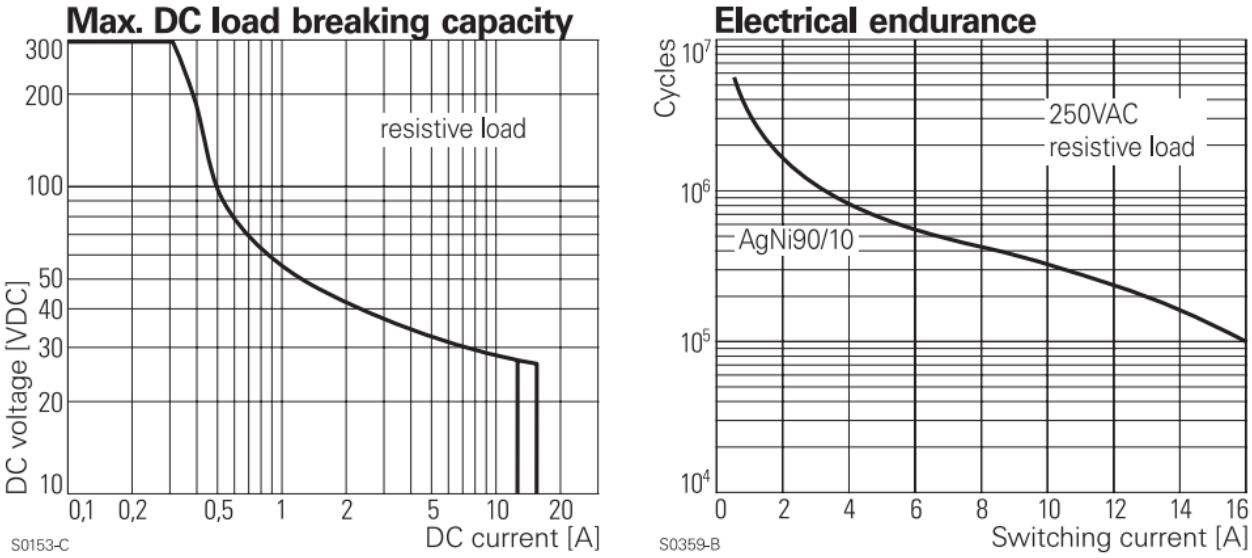


Figure 1 - Max. DC Load Breaking Capacity and Electrical Endurance

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

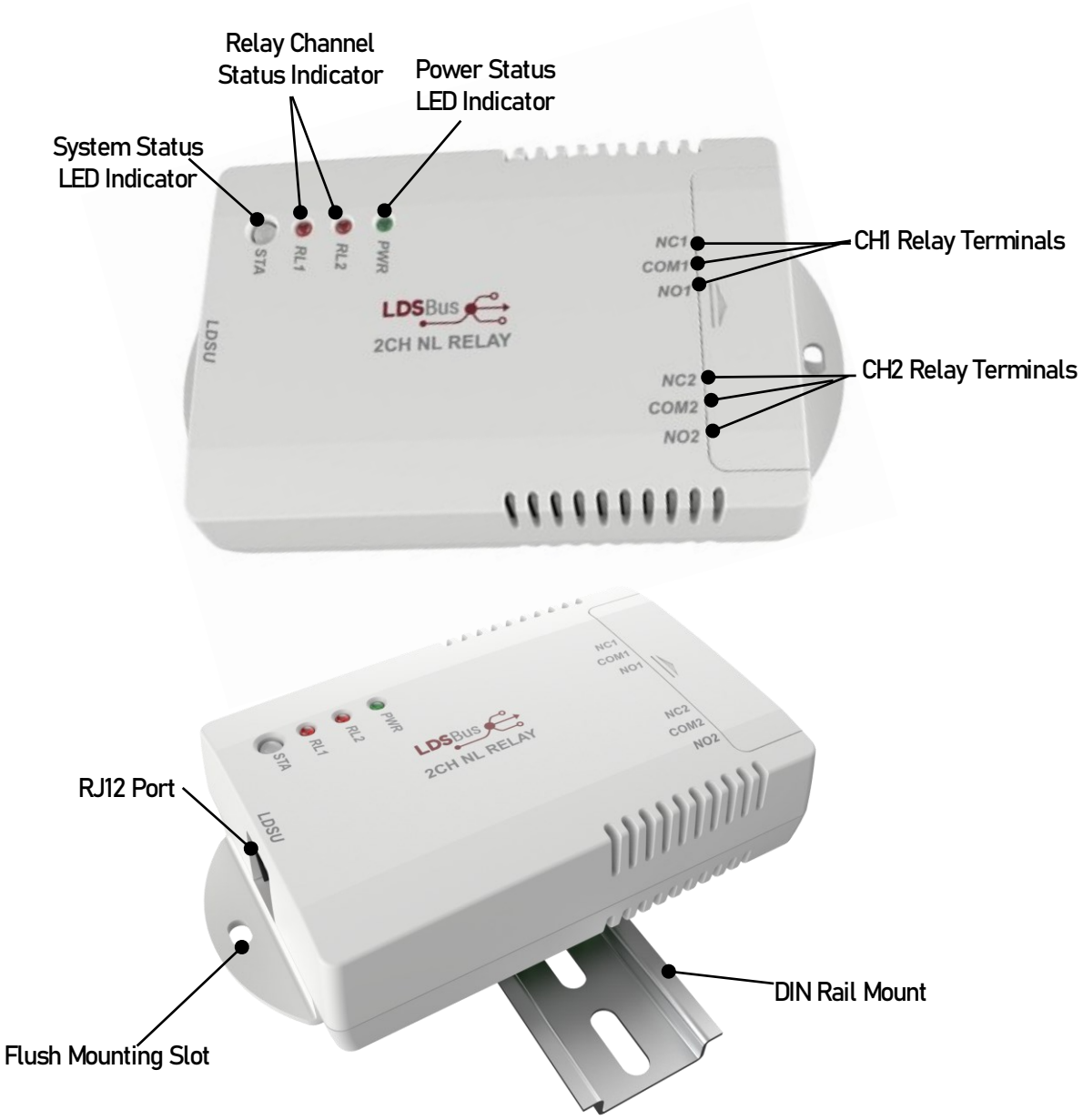
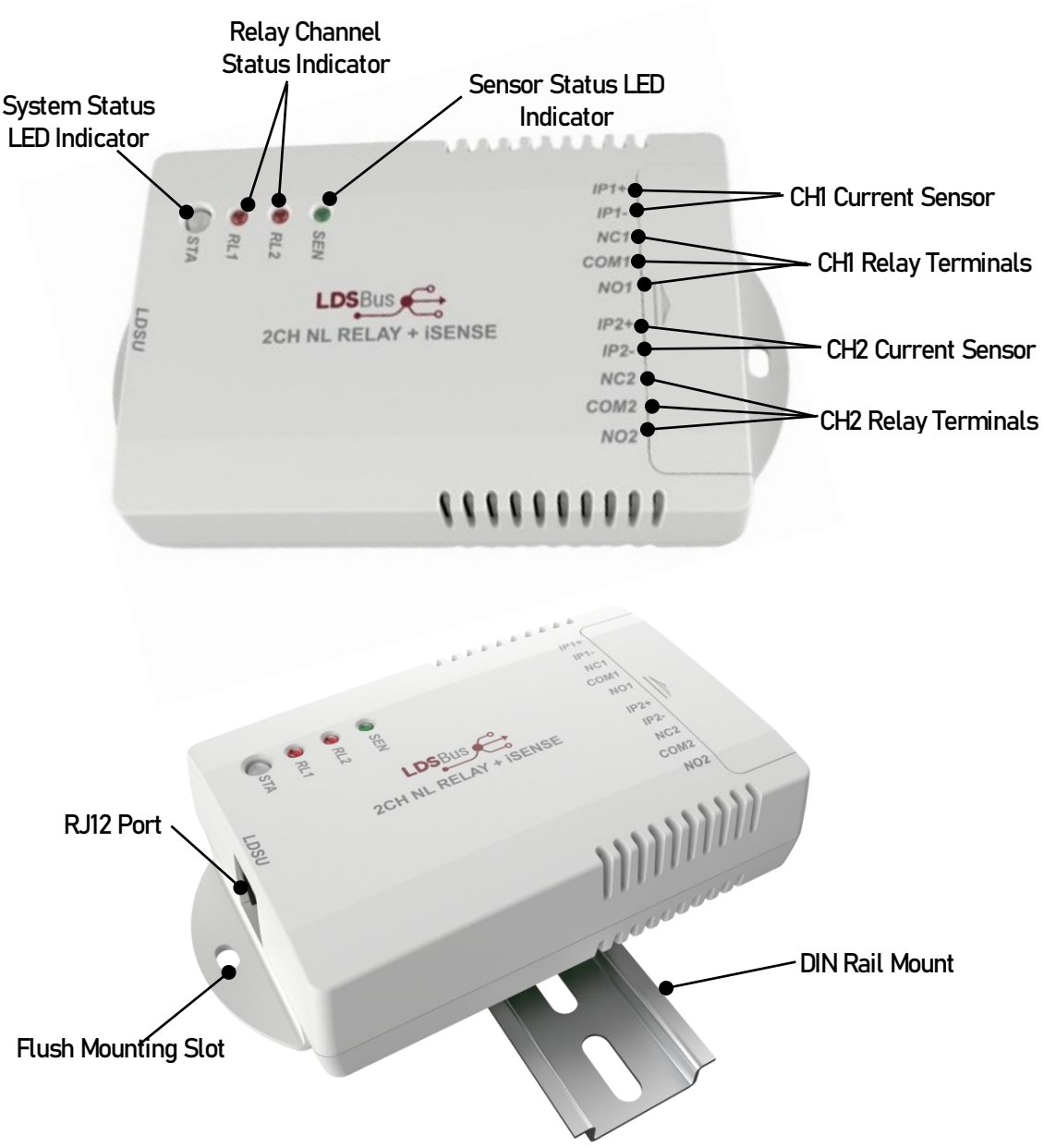


Figure 2 - LDSBus 2CH NL Relay Hardware Features



*Applicable only for LDSBus 2CH NL Relay + iSENSE Model

Figure 3 - LDSBus 2CH NL Relay + iSENSE Hardware Features

Function	Labels	Description	LDSBus 2CH Relay	LDSBus 2CH Relay + iSENSE
CH1 Relay Terminals	COM1	Channel 1 Relay Common Terminal	Yes	Yes
	NC1	Channel 1 Relay Normally Close Terminal	Yes	Yes
	NO1	Channel 1 Relay Normally Open Terminal	Yes	Yes
CH2 Relay Terminals	COM2	Channel 2 Relay Common Terminal	Yes	Yes
	NC2	Channel 2 Relay Normally Close Terminal	Yes	Yes
	NO2	Channel 2 Relay Normally Open Terminal	Yes	Yes
CH1 Current Sensor	IP1+	Channel 1 Current Sensor Positive Terminal*	No	Yes
	IP1-	Channel 1 Current Sensor Negative Terminal*	No	Yes
CH2 Current Sensor	IP2+	Channel 2 Current Sensor Positive Terminal*	No	Yes
	IP2-	Channel 2 Current Sensor Negative Terminal*	No	Yes
Sensor Status LED Indicator	SEN	Power and iSENSE Status LED	No	Yes
Power Status LED Indicator	PWR	Power status LED	Yes	No
Relay Channel Status Indicator	RL1	Relay 1 status LED	Yes	Yes
	RL2	Relay 1 status LED	Yes	Yes
System Status LED Indicator	STA	LDSBus status LED	Yes	Yes
RJ12 Port	LDSU	LDSBus data and power interface port	Yes	Yes

Table 3 - LDSBus 2CH NL Relay / LDSBus 2CH NL Relay + iSENSE Hardware Features

6 Relay Configuration and Installation

Please visit https://brtsys.com/resources/documentation/utility-tools to access the LDSBus Configuration Utility guide on how to configure the device name, device address and termination settings before using it for your application. Normally Open (NO), Normally Close and No Action settings may be configured via the utility.

6.1 Connection Diagram

Figure 4 illustrates the connection of the LDSBus 2CH NL Relay (LDSBus Device) to the LDSBus. Please visit https://brtsys.com/resources/ to view the full device application, setup and installation guides.

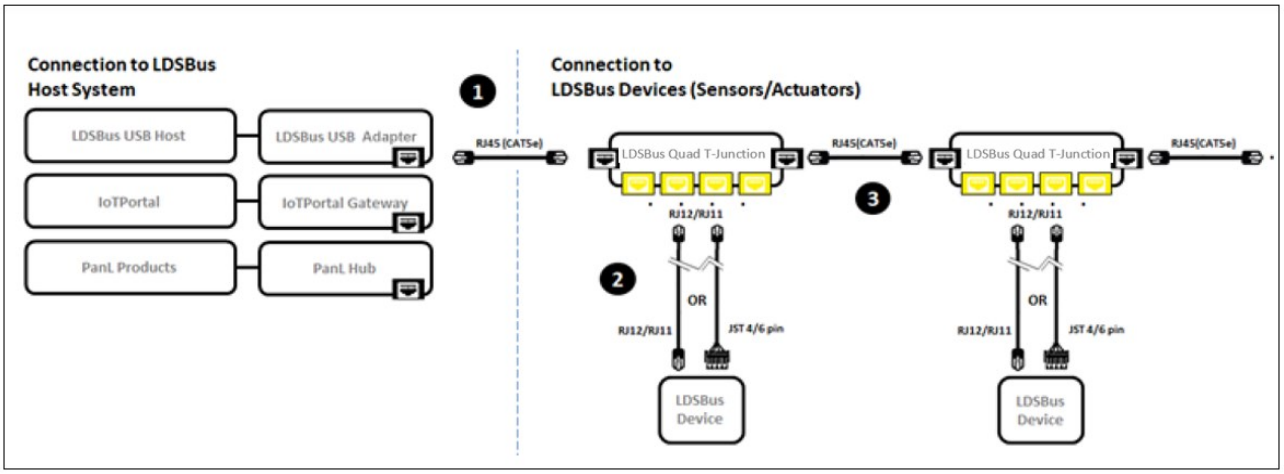


Figure 4 - LDSBus 2CH NL Relay - Connection Diagram

Setup Instructions:

1. Connect the first LDSBus Quad T-Junction to any of the LDSBus Host System using a RJ45(CAT5e) cable.
2. Connect the configured LDSBus Relay to the LDSBus Quad T-Junction as shown in Figure 4.
3. If there is more than one LDSBus Quad T-Junction, chain them together as shown in Figure 4.
4. Enable termination for the last device in LDSBus.

7 Mounting Options

7.1 Flush Mount

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

Figure 5 - LDSBus 2CH NL Relay Flush Mount

7.2 DIN Rail Mount

The LDSBus Relay 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.

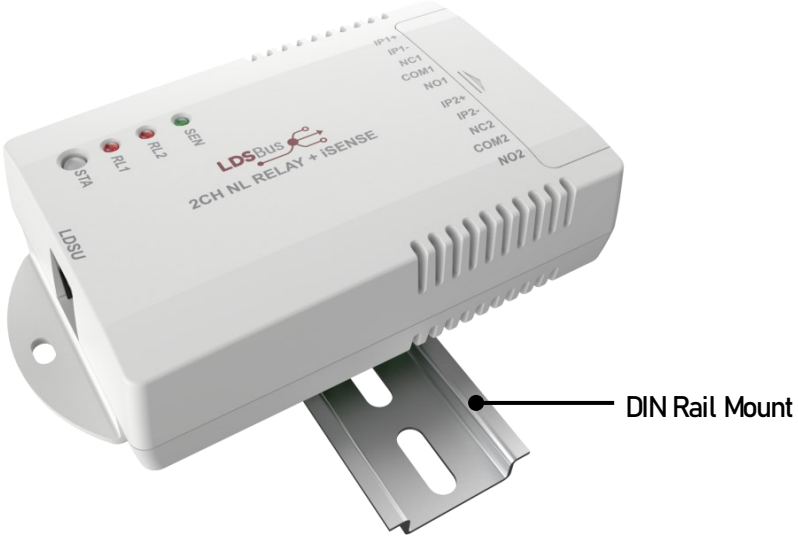


Figure 6 - LDSBus 2CH NL Relay DIN Rail Mount

8 Terminal Wiring Instruction NL Relay Channel/ iSENSE Channel

Connections are made with Push-in CAGE CLAMP technology. If using solid conductor wire / clamp with insulation ferrule, the stripped conductor is easily inserted into the clamp until it hits the backstop without the need for a screwdriver. To remove cable from connector, only use flat head screwdriver to press the push buttons and pull out the wire as shown in Figure 7.

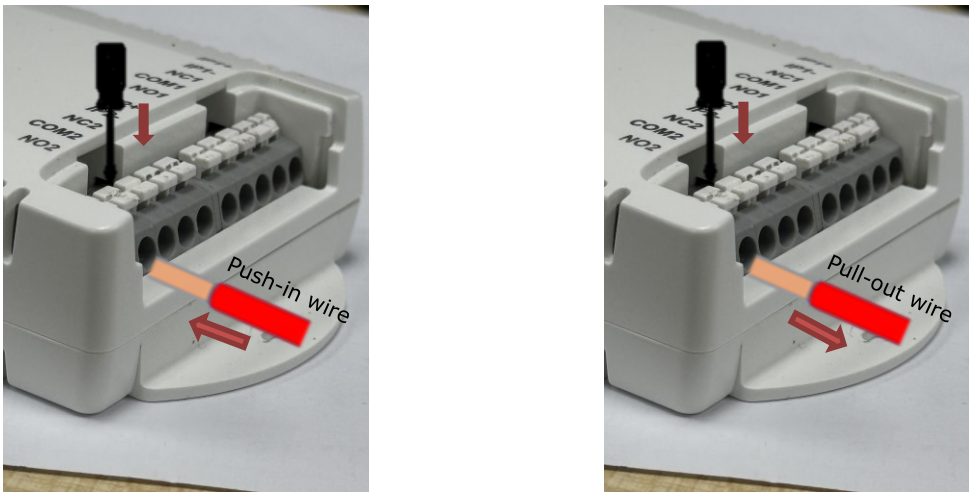


Figure 7 - Push-in wire & Pull-out wire

Table 4 provides a list of American Wire Gauges (AWGs) that can be used in Terminal Blocks.

Conductor Type	Wire dimeter/AWG
Solid conductor	0.25~2.5mm^2/20~12 AWG
Stranded conductor	0.25~2.5mm^2/20~12 AWG
Stranded conductor; with insulated ferrule	0.25~1.5mm^2

Table 4 - AWG to use in Terminal Block

As shown in Figure 8, the wire strip is 8mm to 12mm long.

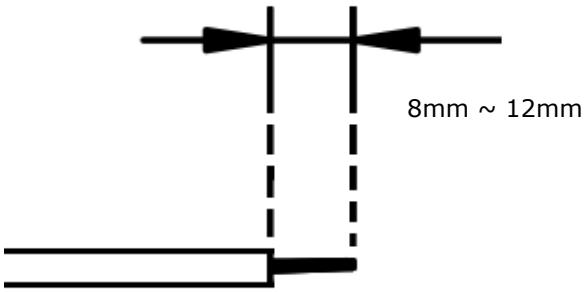
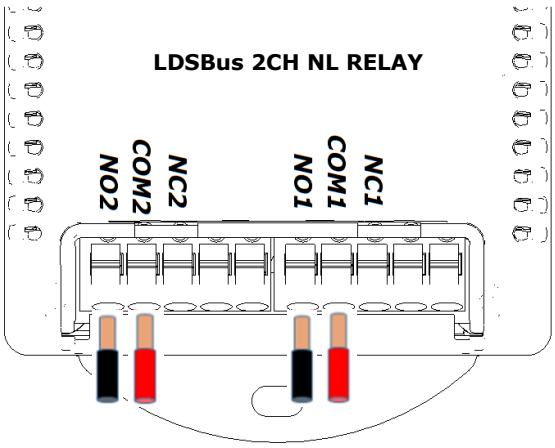


Figure 8 - Wire Strip Length

8.1 Non-Latching Relay (RL1-RL2) Setup

The Non-Latching Relay (RL1-RL2) support AC and DC loads and can manage 250V/16A rating AC load per relay. The following are the two connection options:

Devices Normally OFF (NO)



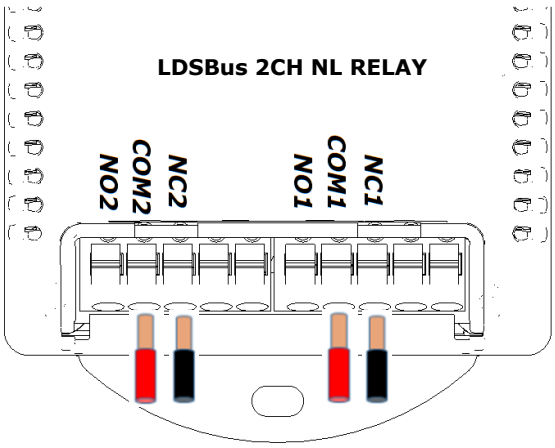
Use AWG 20~12; A RED wire indicates that it comes from an AC/DC Source

→ Connect to the COM PIN

Use AWG 20~12; The BLACK wire indicates that it comes from an electrical device

→ Connect to NO PIN

Devices Normally ON (NC)



Use AWG 20~12; A RED wire indicates that it comes from an AC/DC Source

→ Connect to the COM PIN

Use AWG 20~12; The BLACK wire indicates that it comes from an electrical device

→ Connect to NC PIN

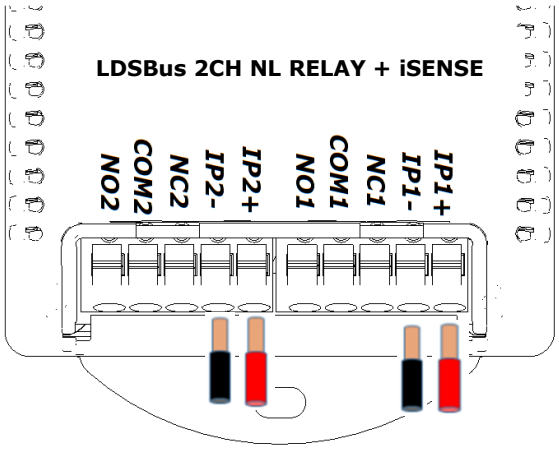
WARNING: When wiring, always TURN OFF the Power Supply.

8.2 iSENSE (SEN1~SEN2) Setup

iSENSE supports bi-directional current sense monitoring up to -20A~+20A per channel. The following are the three connections options:

Note: Each channel is independent and so Channel 1 and Channel 2 can use a different configuration.

Standalone Sensing Monitoring



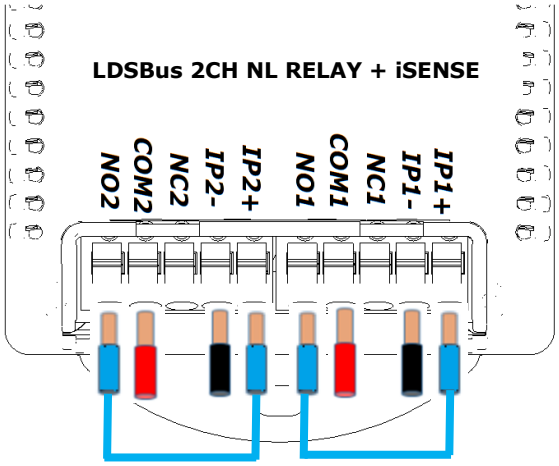
Use AWG 20~12; A RED wire indicates that it comes from an AC/DC Source

→ Connect to the IP+ PIN

Use AWG 20~12; The BLACK wire indicates that it comes from an electrical device

→ Connect to IP- PIN

Sensing Monitoring with RELAY Devices Normally Open (NO)



Use AWG 20~12; A RED wire indicates that it comes from an AC/DC Source

→ Connect to the COM PIN

Use AWG 20~12; The BLACK wire indicates that it comes from an electrical device

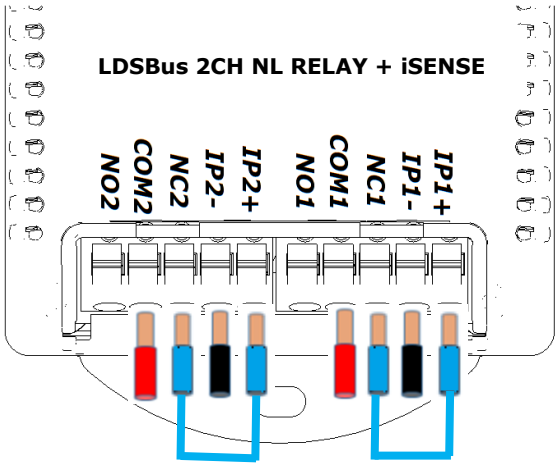
→ Connect to IP- PIN

Use AWG 20~12; BLUE

Connect to NO PIN

→ Connect to IP+ PIN

Sensing Monitoring with RELAY Devices Normally Close (NC)



Use AWG 20~12; A RED wire indicates that it comes from an AC/DC Source

→ Connect to the COM PIN

Use AWG 20~12; The BLACK wire indicates that it comes from an electrical device

→ Connect to IP- PIN

Use AWG 20~12; BLUE

Connect to NC PIN

→ Connect to IP+ PIN

9 System Status LED Indicators

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

Status display colors:

1. RED - Device in error conditions
2. YELLOW - Unconfigured 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
Unconfigured device	YELLOW		LED flashing @1Hz	Unconfigured 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.
Relay 1 and Relay 2	Red		Steady – Non-flashing	COM-NC contacts are closed
	Off		LED Off	COM-NO contacts are closed
PWR/SEN*	Green		Steady – Non-flashing	Power is on/iSENSE is on

*Applicable only for LDSBus 2CH NL Relay + iSENSE Model

Table 5 - System Status LED Indicator

10 Channel Status LED Indicators

There are 2 channel status LEDs. RL1 indicates the status of relay channel 1 and RL2 indicates the status of relay channel 2.

Device Status	LED Color		Description
RL1	OFF		Relay 1 is Inactive
	Red		Relay 1 is Active
RL2	OFF		Relay 2 is Inactive
	Red		Relay 2 is Active
PWR	Green		2CH Relay Power is ON
SEN*	Green		2CH Current Sensing is ON

*Applicable only for LDSBus 2CH NL Relay + iSENSE Model

Table 6 - Channel Status LED Indicators

11 Mechanical Dimensions

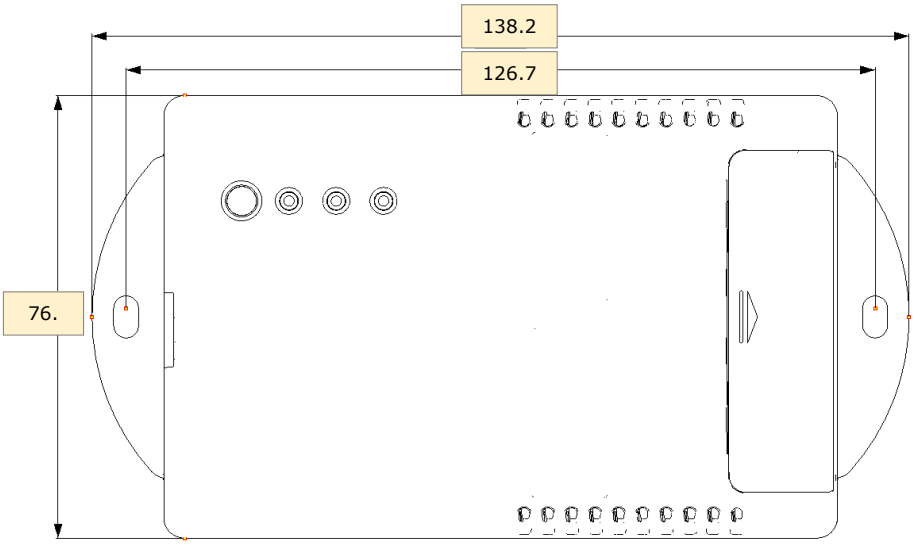


Figure 9 - LDSBus 2CH NL Relay Dimension – Top View

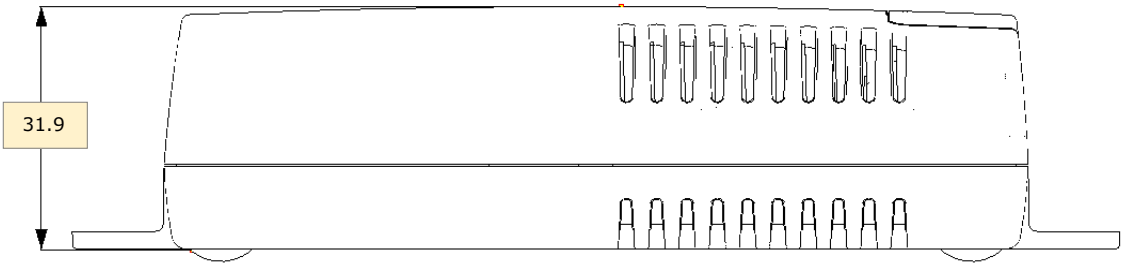


Figure 10 - LDSBus 2CH NL Relay Dimension – Side View

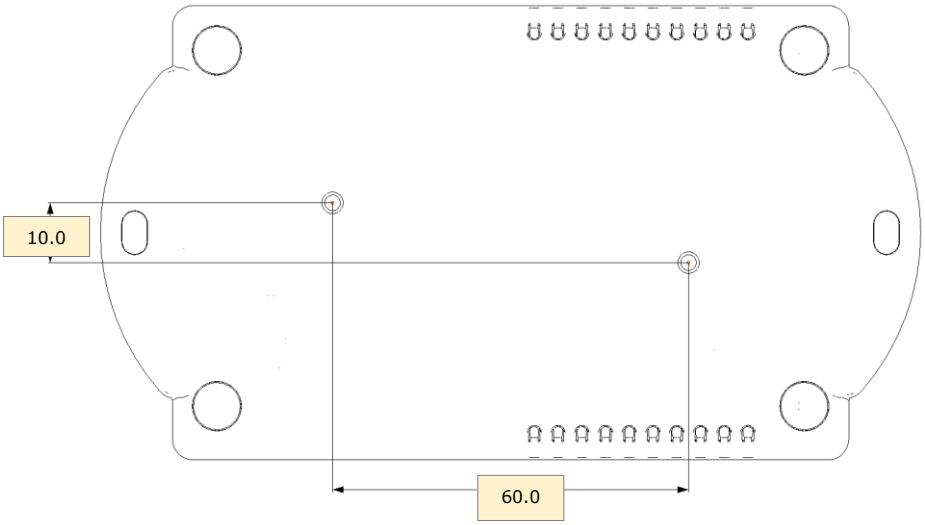


Figure 11 - LDSBus 2CH NL Relay Dimension – Bottom View

Note: All dimensions are in millimetres.

12 Contact Information

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

Appendix A - References

Document References

BRTSYS_AN_001 LDSBus_Configuration_Utility_Guide

BRTSYS_API_004 LDSBus DotNet SDK Guide

Acronyms and Abbreviations

Terms	Description
AC	Alternating Current
AWG	American Wire Gauges
DC	Direct Current
IoT	Internet of Things
LED	Light Emitting Diode
LDSBus	Long Distance Sensor Bus

Appendix B - List of Figures and Tables

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List of Tables

Appendix C – Revision History

Document Title: LDSBus 2CH Non-Latching Relay + iSENSE Datasheet
Document Reference No.: BRTSYS_000147
Clearance No.: BRTSYS#099
Product Page: https://brtsys.com/product-category/actuators/
Document Feedback: Send Feedback

Revision	Changes	Date
Version 1.0	Initial Release	28-02-2025