



## LDSBus Gas and TrueVOC Sensor Datasheet



### 1 Introduction

With the LDSBus Gas and TrueVOC Sensor, you can measure Total Volatile Organic Compound (TVOC) and Index Air Quality (IAQ) in a compact and low-profile design. Additionally, this device offers various mounting options including flush and swivel mounts. Both flush and swivel mounting options are suitable for installation on walls and ceilings.

It seamlessly integrates with various platforms, including BRTSys's IoTPortal, PanL Smart Living and LDSBus Python and .NET SDKs.

### 1.1 Features

- Integrated sensors for TrueVOC and Index Air Quality (IAQ) measurements
- TVOC measurement up to 65000 ppb with  $\pm 12\%$  Accuracy
- IAQ measurement from 0 to 500 with  $\pm 12\%$  Accuracy
- Utilizes BRTSys's LDSBus protocol to transmit data and power via the LDSBus Quad T-Junction
- Low power consumption of 271mW
- Operating temperature range: 0°C to +70°C
- Offers both Swivel mount and Flush mount options.
- Supported platform application: BRTSys's PanL Smart Living, IoTPortal and LDSBus Python and .NET SDKs (Visit <https://brtsys.com/resources>)



Neither the whole nor any part of the information contained in, or the product described in this manual, may be adapted, or Reproduced in any material or electronic form without the prior written consent of the copyright holder. This product and its documentation are supplied on an as-is basis and no warranty as to their suitability for any particular purpose is either made or implied. BRT Systems Pte Ltd (BRTSys) will not accept any claim for damages howsoever arising as a result of use or failure of this product. Your statutory rights are not affected. This product or any variant of it is not intended for use in any medical appliance, device, or System in which the failure of the product might reasonably be expected to result in personal injury. This document provides preliminary information that may be subject to change without notice. No freedom to use patents or other intellectual property rights is implied by the publication of this document. BRT Systems Pte Ltd, 1 Tai Seng Avenue, Tower A, #03-01 Singapore 536464. Singapore Registered Company Number: 202220043R.

## 2 Part Numbers/Ordering Information

<b>Part#</b>	<b>Description</b>
LS020301A	LDSBus Gas and TrueVOC Sensor – Flush
LS021301A	LDSBus Gas and TrueVOC Sensor – Swivel

**Table 1 – LDSBus Gas and TrueVOC Sensor Part Numbers & Description**

## Table of Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
<b>2</b>	<b>Part Numbers/Ordering Information .....</b>	<b>2</b>
<b>3</b>	<b>Specifications .....</b>	<b>4</b>
<b>4</b>	<b>FCC Compliance Statement.....</b>	<b>5</b>
<b>5</b>	<b>Hardware Features .....</b>	<b>6</b>
5.1	System Status LED Indicator.....	7
5.2	Flush Mount Slot .....	7
5.3	Swivel Mount Slot .....	7
<b>6</b>	<b>Configuration, Installation &amp; Application .....</b>	<b>8</b>
6.1	Connection Diagram.....	8
<b>7</b>	<b>Mounting Instructions.....</b>	<b>9</b>
7.1	Flush Mount .....	9
7.2	Swivel Mount .....	10
<b>8</b>	<b>System Status LED Indicators .....</b>	<b>13</b>
<b>9</b>	<b>Mechanical Dimension.....</b>	<b>14</b>
<b>10</b>	<b>Contact Information.....</b>	<b>17</b>
<b>Appendix A - References .....</b>		<b>18</b>
Document References .....		18
Acronyms and Abbreviations .....		18
<b>Appendix B - List of Figures and Tables .....</b>		<b>19</b>
List of Figures .....		19
List of Tables .....		19
<b>Appendix C – Revision History .....</b>		<b>20</b>

### 3 Specifications

<b>Features</b>	Sensor	TVOC Sensor AQI Sensor
	Interface	RS485
	LED Indicator (RGB)	System Status Indicator (Please refer to <a href="#">LED</a> section)
	Mounting	Flush Mount - Fixed Angle Installation Swivel Mount - Adjustable Angle Installation
<b>Power</b>	Input Voltage	5V DC Bus Power
	Power Consumption	Typical Power: 183mW Max. Power: 271mW
<b>TVOC Sensor</b>	TVOC Output Range	0-65000 ppb
	Accuracy Sensor to Sensor	± 12%
	Initial Start Up time	1 Hour (After each power ON)
	Initial stabilisation Time	48 Hours (After first power ON)
	Warm Up Time	3 Minutes
<b>IAQ Sensor</b>	Sampling Rate	5 Seconds
	IAQ Output Range	0-500
	Accuracy Sensor to Sensor	± 12%
	Initial Start Up time	1 Hour (After each power ON)
	Initial stabilisation Time	48 Hours (After first power ON)
<b>Physical Characteristics</b>	Warm Up Time	3 Minutes
	Sampling Rate	5 Seconds
	Color	White
	Housing	Polycarbonate
<b>Environmental Limits</b>	Dimensions	62mm x H25mm (Flush) 62mm x H60mm (Swivel)
	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 Gas and TrueVOC Sensor
	Wire Assembly	1X 5m RJ11-JST Cable
	Self-Tapping Screws	2X M3*16mm (Thread)

**Table 2 - LDSBus Gas and TrueVOC Sensor Specifications**

## 4 FCC Compliance Statement

**LDSBus Gas and TrueVOC Sensor** 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 **LDSBus Gas and TrueVOC Sensor** device and the user's body must be always maintained.

### FCC Radiation Exposure Statement

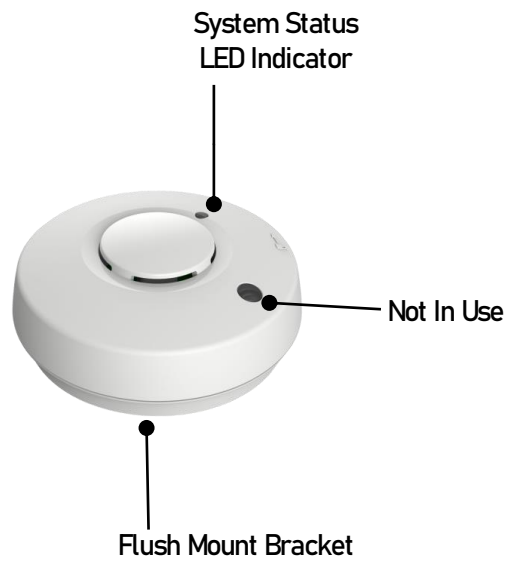
This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed 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

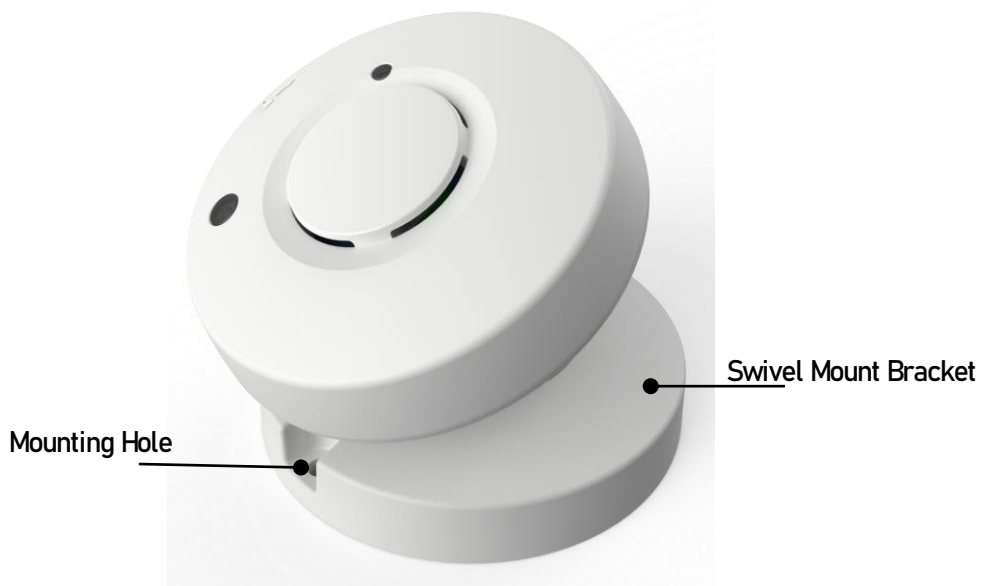
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



## 5 Hardware Features



**Figure 1 - LDSBus Gas and TrueVOC Sensor Hardware Features- Flush Mount**



**Figure 2 - LDSBus Gas and TrueVOC Sensor Hardware Features- Swivel Mount**

## **5.1 System Status LED Indicator**

A LED indicates device status representing a certain application event. Refer to [section 8](#) for more details.

## **5.2 Flush Mount Slot**

The Flush Mount Slot allows mounting of devices into openings or enclosures. During installation, the device is mounted on the front side and secured on the rear side.

## **5.3 Swivel Mount Slot**

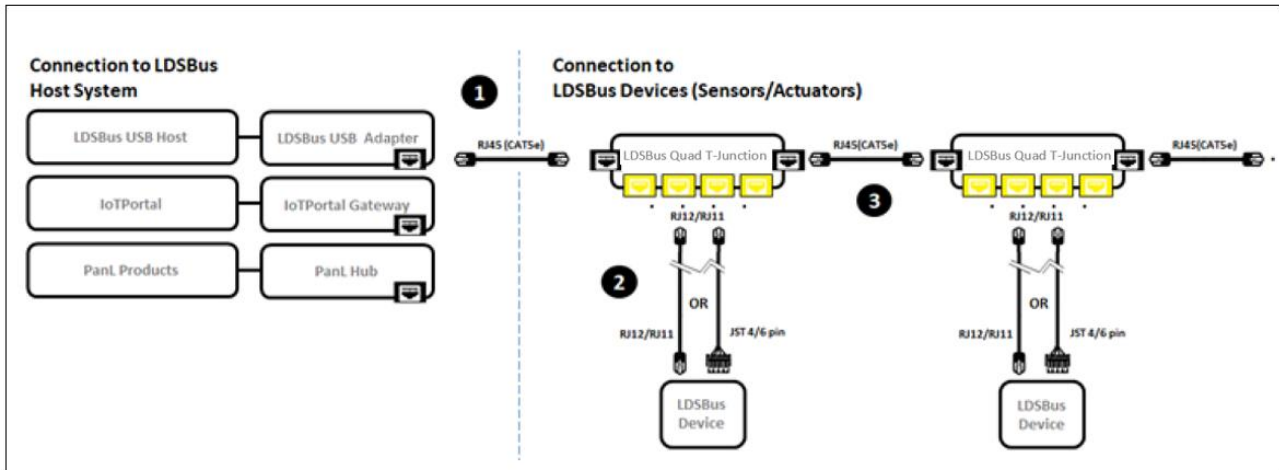
The Swivel Mount Slot allows movement or adjustment in a vertical position. This means the attached device can be turned freely.

## 6 Configuration, Installation & Application

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.

### 6.1 Connection Diagram

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



**Figure 3 - LDSBus Gas and TrueVOC Sensor to LDSBus – Connection Diagram**

#### **Setup Instructions:**

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



## 7 Mounting Instructions

Make sure the device has been configured using the LDSBus Configuration Utility before mounting.

### 7.1 Flush Mount

The flush mounting procedure assumes a flat hollow surface behind which the LDSBus RJ11-JST cable is concealed and made accessible through an opening. Figure shows the front face of the LDSBus Gas and TrueVOC Sensor device. Note the lock/unlock direction in the cover.



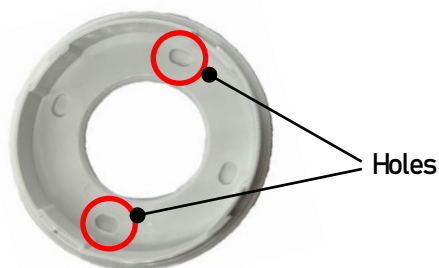
**Figure 4 - LDSBus Gas and TrueVOC Sensor**

Follow these steps to fix the flush mount –

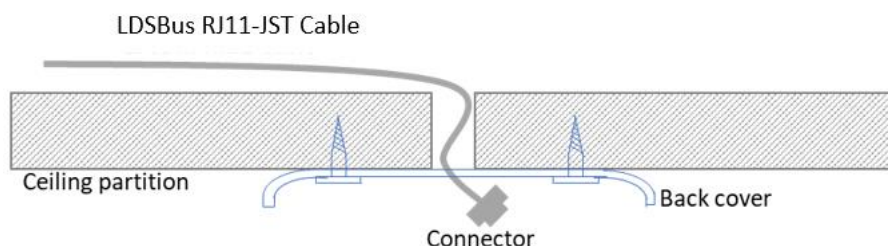
1. Unlock the back cover. Twist the top cover in the anti-clockwise direction to unlock.



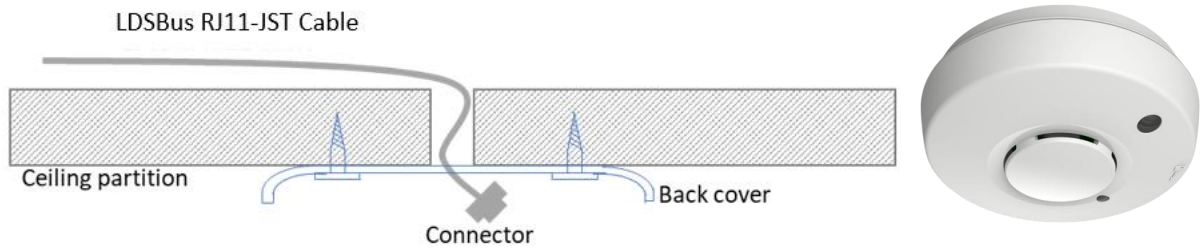
2. Make two holes in the back cover using the indentations as guides.



3. Prepare the ceiling and route the RJ11-JST cable through the ceiling opening. Run the LDSBus RJ11-JST cable through the centre (hole) of the back cover and fasten the back cover to the ceiling with self-tapping screws as shown in the picture below –

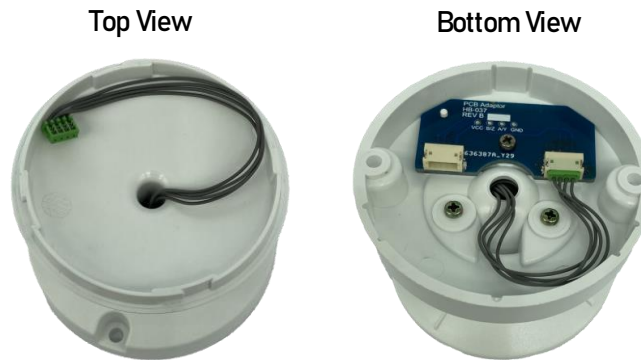


4. Attach the cable to the JST connector of the sensor.
5. Twist the front face in a clockwise direction to attach it to the back cover and lock it.



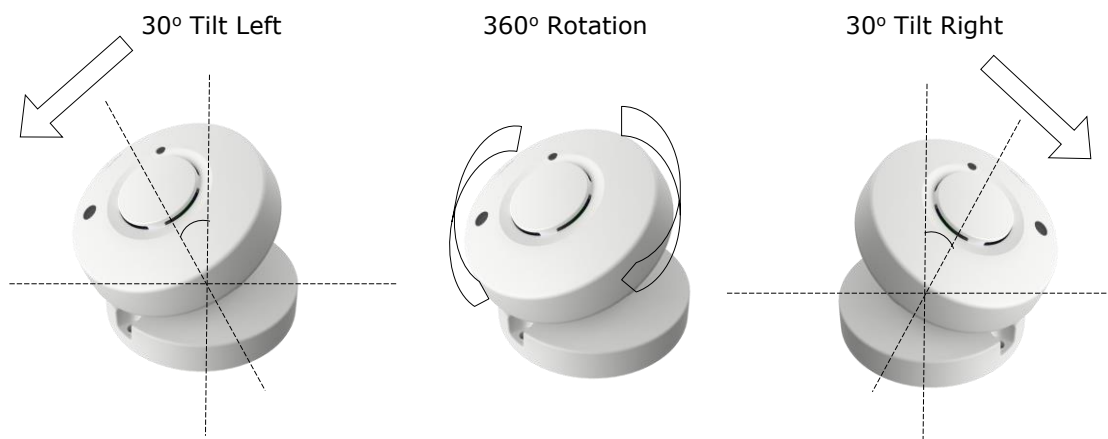
## 7.2 Swivel Mount

The swivel mount is shown in Figure 5.



**Figure 5 - LDSBus Gas and TrueVOC Sensor – Swivel Mount – Top & Bottom View**

Angle of Rotation:

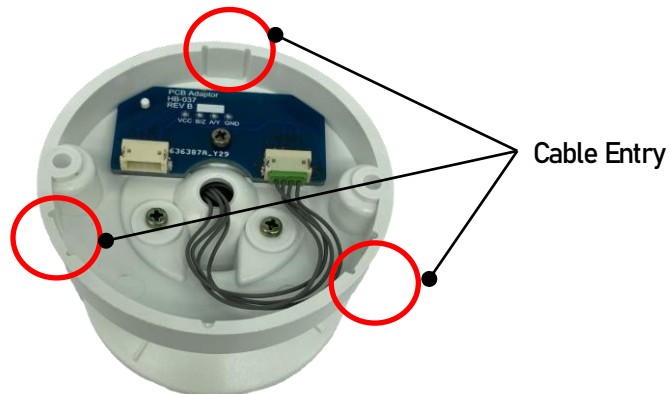


**Figure 6 - LDSBus Gas and TrueVOC Sensor – Swivel Mount – Angle of Rotation**

Follow these steps to fix the swivel mount –

1. Choose the position for the wall mount and drill holes for mounting the swivel mount on the wall.

- Route and affix the LDSBus RJ11-JST cable on the wall through a buried or wall mounted conduit to butt against the base of the swivel mount.
- Break off one of the three cable entry locations on the base plate for cable routing.



- Connect the LDSBus RJ11-JST cable to the JST connector (Swivel Mount bottom section) as shown in the Figure.



- Fasten the swivel mount to the wall using the mounting screws. Ensure that the cable is sitting in the cable entry slot.
- Remove the sensor from the flush mount back cover by turning it in an anti-clockwise direction.



- Connect the JST cable from the top section of the swivel mount to the JST connector located on the back of the device.



8. Attach the device to the top section of the swivel mount.



9. Turn the device clockwise to secure it to the swivel mount.












## 8 System Status LED Indicators

LDSU devices come with a tri-color LED. The LED status colors are described in the table below.

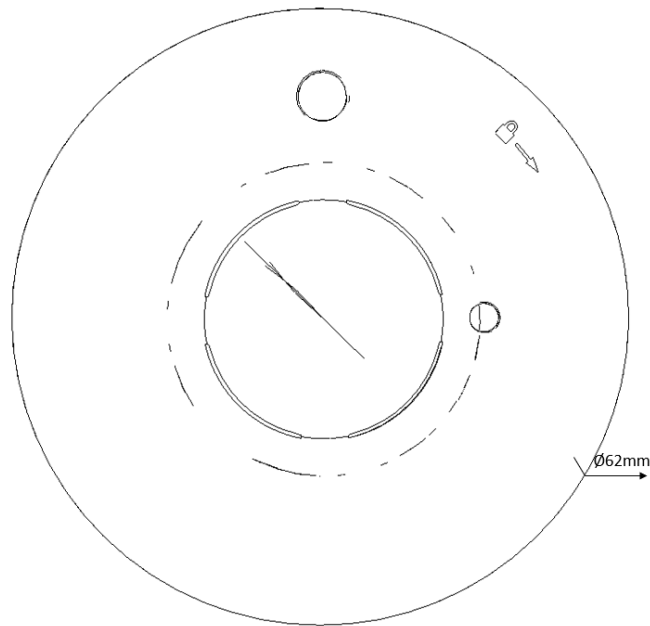
Status display colors

1. RED - Device in error condition
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)

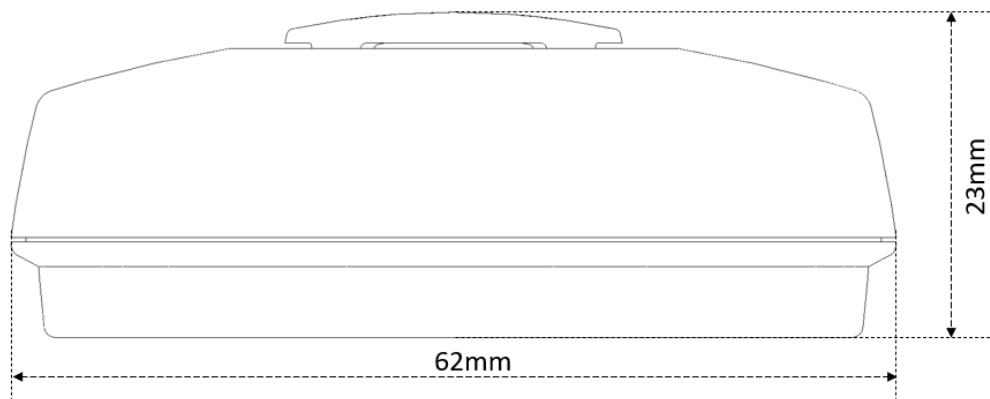
Device Status	LED Color	Flashing Frequency	Description
Un-configured device	YELLOW 	LED flashing @1Hz	Un-configured device with factory default address (126)
Configured device	GREEN 	Steady – non-flashing	Configured device (Device ID 1-125) and device is idle.
	BLUE 		
Addressed device	GREEN 	LED flashing @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 3 – LDSBus Gas and TrueVOC Sensor – System Status LED Indicator**

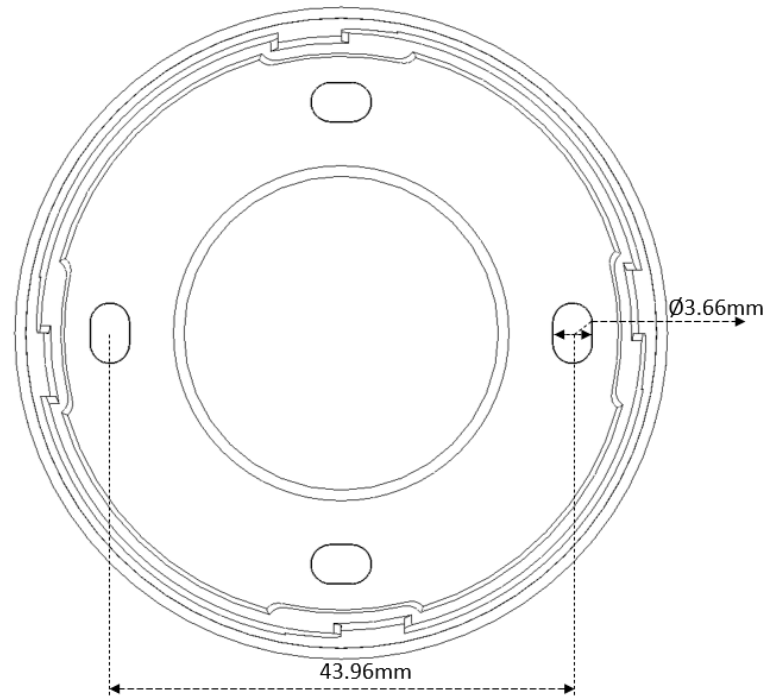
## 9 Mechanical Dimension



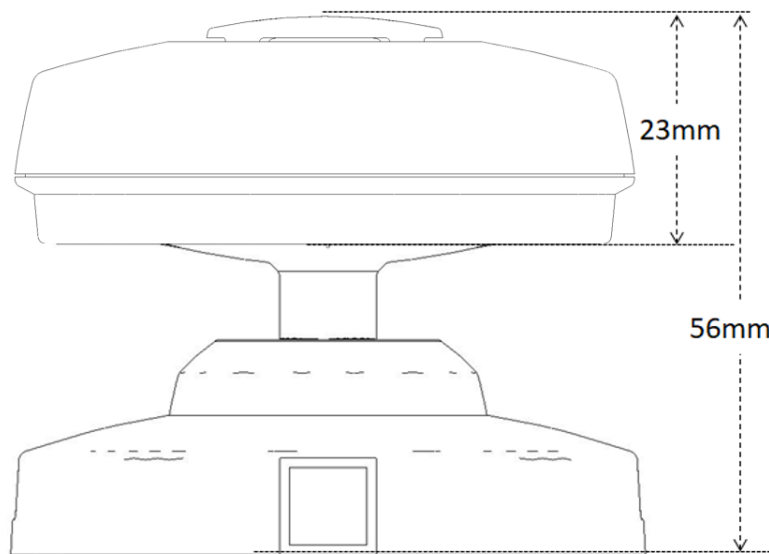
**Figure 7 - LDSBus Gas and TrueVOC Sensor Dimension – Top View**



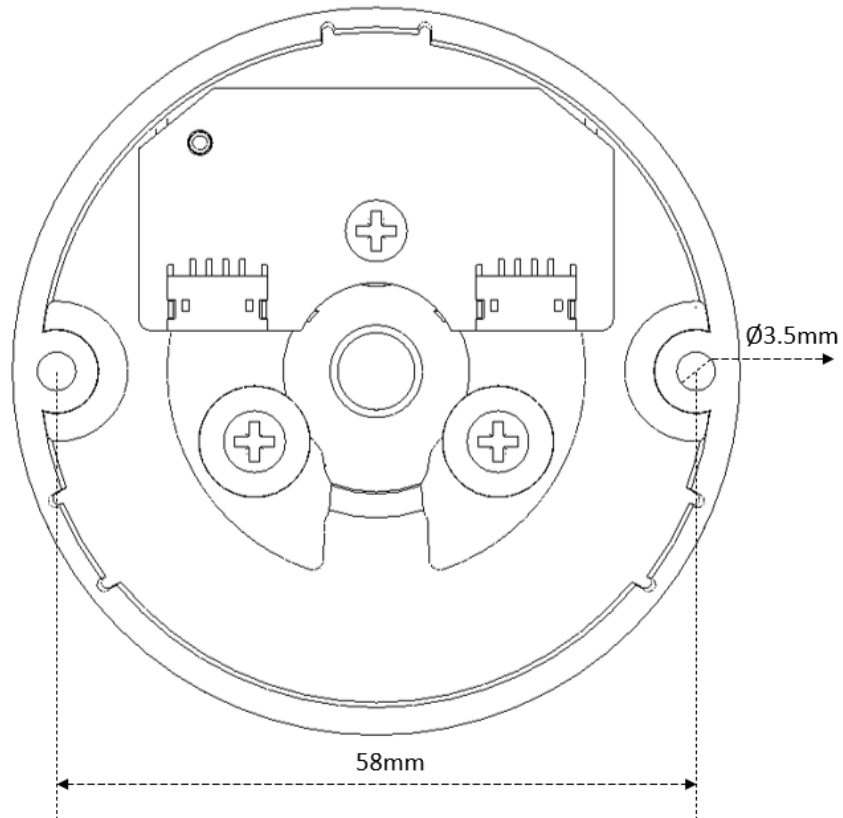
**Figure 8 - LDSBus Gas and TrueVOC Sensor Dimension – Side View Flush Mount**



**Figure 9 - LDSBus Gas and TrueVOC Sensor Mounting Holes – Flush Mount**



**Figure 10 - LDSBus Gas and TrueVOC Sensor Dimension – Side View- Swivel Mount**



**Figure 11 - LDSBus Gas and TrueVOC Sensor Mounting Holes – Swivel Mount**

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



## 10 Contact Information

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

System and equipment manufacturers and designers are responsible to ensure that their systems, and any BRT Systems Pte Ltd (BRTSys) devices incorporated in their systems, meet all applicable safety, regulatory and system-level performance requirements. All application-related information in this document (including application descriptions, suggested BRTSys devices and other materials) is provided for reference only. While BRTSys has taken care to assure it is accurate, this information is subject to customer confirmation, and BRTSys disclaims all liability for system designs and for any applications assistance provided by BRTSys. Use of BRTSys devices in life support and/or safety applications is entirely at the user's risk, and the user agrees to defend, indemnify, and hold harmless BRTSys from any and all damages, claims, suits, or expense resulting from such use. This document is subject to change without notice. No freedom to use patents or other intellectual property rights is implied by the publication of this document. Neither the whole nor any part of the information contained in, or the product described in this document, may be adapted, or reproduced in any material or electronic form without the prior written consent of the copyright holder. BRT Systems Pte Ltd, 1 Tai Seng Avenue, Tower A, #03-01, Singapore 536464. Singapore Registered Company Number: 202220043R.

## Appendix A - References

### Document References

[BRTSYS\\_AN\\_001 LDSBus Configuration Utility Guide](#)

[BRTSYS\\_API\\_001 LDSBus Python SDK Guide](#)

[BRTSYS\\_API\\_004 LDSBus DotNet SDK Guide](#)

### Acronyms and Abbreviations

Terms	Description
DC	Direct Current
LDSBus	Long Distance Sensor Bus
LED	Light Emitting Diode
TVOC	Total Volatile Organic Compounds
IAQ	Index Air Quality

## **Appendix B - List of Figures and Tables**

### **List of Figures**

Figure 1 - LDSBus Gas and TrueVOC Sensor Hardware Features- Flush Mount.....	6
Figure 2 - LDSBus Gas and TrueVOC Sensor Hardware Features- Swivel Mount .....	6
Figure 3 - LDSBus Gas and TrueVOC Sensor to LDSBus – Connection Diagram.....	8
Figure 4 - LDSBus Gas and TrueVOC Sensor .....	9
Figure 5 - LDSBus Gas and TrueVOC Sensor – Swivel Mount – Top & Bottom View.....	10
Figure 6 - LDSBus Gas and TrueVOC Sensor – Swivel Mount – Angle of Rotation .....	10
Figure 7 - LDSBus Gas and TrueVOC Sensor Dimension – Top View .....	14
Figure 8 - LDSBus Gas and TrueVOC Sensor Dimension – Side View Flush Mount.....	14
Figure 9 - LDSBus Gas and TrueVOC Sensor Mounting Holes – Flush Mount .....	15
Figure 10 - LDSBus Gas and TrueVOC Sensor Dimension – Side View- Swivel Mount.....	15
Figure 11 - LDSBus Gas and TrueVOC Sensor Mounting Holes – Swivel Mount.....	16

### **List of Tables**

Table 1 – LDSBus Gas and TrueVOC Sensor Part Numbers & Description .....	2
Table 1 - LDSBus Gas and TrueVOC Sensor Specifications .....	4
Table 2 – LDSBus Gas and TrueVOC Sensor – System Status LED Indicator .....	13

## Appendix C – Revision History

Document Title: LDSBus Gas and TrueVOC Sensor Datasheet  
Document Reference No.: BRTSYS\_000100  
Clearance No.: BRTSYS#068  
Product Page: <https://brtsys.com/ldsbus/>  
Document Feedback: [Send Feedback](#)

Revision	Changes	Date
Version 1.0	Initial Release	17-04-2024