



# Ra-09-DTU Specification

Version V1.2.0

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## Document resume

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## 1. Product overview

Ra-09-DTU is an intelligent wireless data communication DTU developed by Ai-Thinker Co.,Ltd using the Ra-09 LoRa module developed by Ai-Thinker Co.,Ltd using LoRa wireless technology can be used for ultra-long distance spread spectrum communication. Its chip, the STM32WLE5CCU6, is a general-purpose LPWAN wireless communication SoC that integrates an RF transceiver, modem, and 32-bit Arm® Cortex-M4 MCU. The MCU uses the ARM core and can operate at a frequency of 48MHz. Supports LoRa modulation and traditional (G)FSK modulation for LPWAN use cases; At the same time, the transmitter also supports BPSK modulation and (G)MSK modulation, and the receiver supports (G)MSK modulation. With standard RS485 hardware interface.

The Ra-09-DTU provides ultra-long range and ultra-low power communication for LPWAN applications, which can be widely used in smart meters, supply chain and logistics, home building automation, security systems, remote irrigation systems and other scenarios.

## 1.1. Characteristic

- Ultra-long distance transmission
- 256KB Flash;64KB SRAM
- A group of isolated RS485
- Supports firmware OTA
- View the running status of each data channel through LED
- Wide voltage supply (6~36V)
- Electric cabinet fence installation

## 1.2. Typical application scenarios:

- ✓ Smart home
- ✓ Smart business
- ✓ Smart security
- ✓ Smart lighting
- ✓ Smart factory
- ✓ Smart storage
- ✓ Remote Meter Reading
- ✓ Agricultural irrigation

## 2. Main parameter

**Table 1 Main parameter description**

<b>Model</b>	Ra-09-DTU
<b>Installation Method</b>	Electrical cabinet fence
<b>Antenna</b>	SMA external antenna
<b>Frequency range</b>	410MHz-525MHz
<b>Operation temperature</b>	-40°C~ 70°C
<b>Storage environment</b>	-40°C~ 70°C, < 90%RH
<b>Power supply</b>	Power supply voltage 6~36V, power supply current $\geq 500\text{mA}$
<b>Interface</b>	RS485, relay control
<b>Series Rate</b>	Default 9600 bps
<b>Flash</b>	256KB
<b>SRAM</b>	64KB

### 2.1. Interface Specification

**Table 2 Interface description**

<b>Name</b>	<b>Silk screen logo</b>	<b>Description</b>
Power interface	DC 6~36V	DC power interface, DC6~36V
RS485 interface	RS485 A B	Isolated RS485; For RS485 communication, the default baud rate is 9600. Connect RS485 device A(+) to A(+),B(-) to B(-).
Relay control	Relay COM OUT	Can be used to control the on and off of an external wire, rated current 5A
Button	RST	System reset
Antenna interface	/	Lora antenna interface, SMA female head, 410MHz-525MHz, theoretical maximum transmission power +22dBm

## 2.2. Indicator Light

**Table 3 Indicators**

Colour	Silk screen logo	Description
Yellow	POWER	Power indicator, steady on
Green	RUN	Device running status indicator
Green	RS485	RS485 running status indicator
Green	LoRa	Lora running status indicator
Red	ERROR	Device error status indicator

## 2.3. RF Parameters

**Table 4 RF parameters**

Output Power					
PA parameter	Frequency band	Min.	Typical	Max.	Unit
Output Power	433MHz	-	21	22	dBm
Output Power	470MHz	-	21	22	dBm
Output Power	490MHz	-	21	22	dBm
Output Power	510MHz	-	21	22	dBm
Receiving sensitivity Modulation bandwidth 125kHz					
Model		Min.	Typical	Max.	Unit
SF7		-	-123	-	dBm
SF8		-	-126	-	dBm
SF9		-	-128	-	dBm
SF10		-	-131	-	dBm
SF11		-	-135	-	dBm
SF12		-	-140	-	dBm

### 3. Appearance size



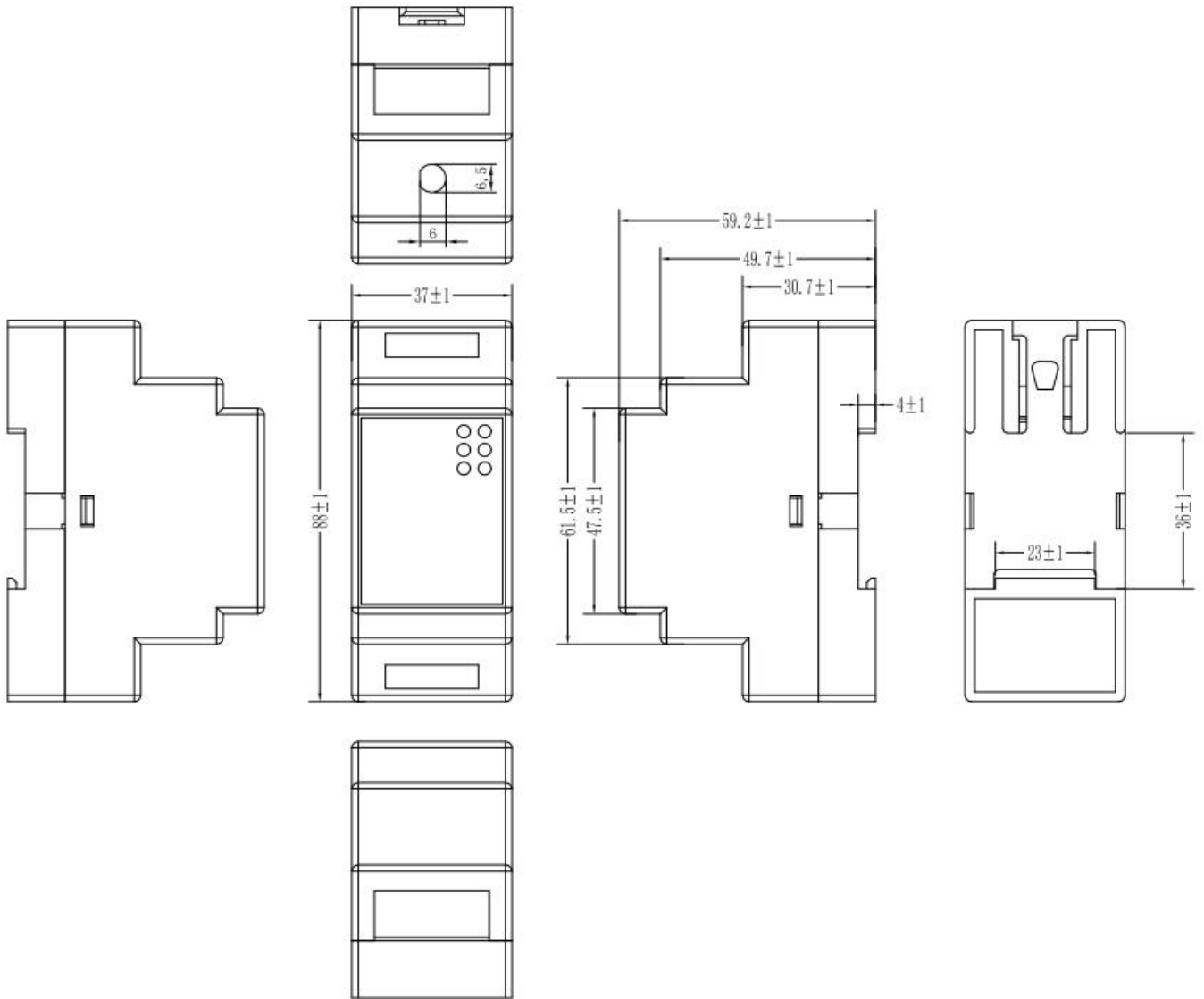
Front

Back

**Figure 1 Appearance**

**(rendering is for reference only, subject to actual objects)**





**Figure 2 Appearance size drawing**

**(Appearance size drawing is for reference only, subject to the actual)**

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