CAN alyst-II

USR-CAN300 series

User Manual

Your Trustworthy Smart Industrial IoT Partner

catal

1. Product Overview

1.1. Product Introduction

The USRCAN300 series CAN analyzer (CANalyst-II) features a full-speed USB 2.0 interface and dual CAN ports. The first port supports high-speed CAN, while the second can be configured via software to operate as either high-speed CAN or low-speed fault-tolerant CAN. It provides comprehensive CAN bus protocol analysis, including SAE J1939, DeviceNet, CANopen, iCAN, and custom high-level protocols. The analyzer is fully compatible with Zhou Ligongs CANTest, CANPro, and ZCANpro software.

The analyzer functions as a standard CAN node, serving as a powerful tool for CAN bus product development, device testing, and data analysis. With this interface adapter, PCs can connect to a standard CAN network via USB, making it ideal for building fieldbus testing labs, industrial control systems, smart buildings, automotive electronics, and other applications for data processing, acquisition, and communication. Additionally, its compact size and easy installation make it the top choice for portable system users.

The USRCAN300 series analyzer features an electrical isolation system with an independent isolated DC-DC power module and a high-speed magnetic isolation module for the CAN bus circuit. This design ensures the interface adapter has strong anti-interference capability, significantly enhancing the systems reliability in harsh environments. The USB, CAN1, and CAN2 ports are completely isolated from each other.

The product supports direct CAN bus configuration, data transmission, and reception using the manufacturers USB_CAN TOOL software. Users may also utilize the provided DLL dynamic link libraries, C++Builder, C#, VC, VB, VB.NET, Delphi, LABVIEW, LabWindows/CVI, and Matlab to develop custom applications, enabling efficient development of CAN system software products.

When using the analyzer for secondary development, you dont need to understand the complex USB interface communication protocol.

1.2. product types choosing

The USR-CAN300 series analyzer is available in two versions, allowing users to select the most suitable option based on their specific needs.

The following technical specifications and features are based on the full-featured CAN300s top-tier model. Please note the functional differences between versions.

model	USR-CAN300 (Professional Version)	USR-CAN300s (Premium Version)
CAN number of channels	2	2
barrier isolation	2500V	2500V
CANopen/J1939	√	√
Relay and transparent	√	√

transmission		
Windows system	√	√
Linux system	-	√
Low speed / fault tolerant / single wire CAN	-	√
ISO 15765 protocol	-	√
characteristic	-	Meets all types of CAN bus lines

Note: For details on CAN relay and transparent transmission functions, please refer to the documentation "7. Plugin 3: Relay, Transparent Transmission Functions and Relay Software Usage Guide.pdf".

1.3. Performance and Technical Specifications

- USB-to-CAN bus protocol conversion;
- Equipped with 2-channel CAN interface;

The USRCAN300 Professional Edition features dual high-speed CAN channels, each supporting baud rates from 10Kbps to 1Mbps.

The top-tier USRCAN300s model features a high-speed CAN channel (CAN1) and a configurable CAN2 channel that can be set to either high-speed CAN or low-speed fault-tolerant CAN via software configuration.

- The USB interface supports USB 3.0 and 2.0, while being backward compatible with USB 1.1 and OTG standards.
- Supports CAN2.0A and CAN2.0B protocols, including both standard and extended frames;
- Supports bidirectional transmission for both CAN sending and receiving;
- Supports data frame and remote frame formats;
- The CAN controller supports configurable baud rates ranging from 10Kbps to 1Mbps via software configuration.

The CAN1 channel is a high-speed CAN bus, with baud rate configurable via software between 10Kbps and 1Mbps.

When the CAN2 channel is configured as high-speed CAN via software, the baud rate ranges from 10Kbps to 1Mbps.

When the CAN2 channel is configured via software as a low-speed fault-tolerant CAN, the baud rate ranges from 10Kbps to 125Kbps.

- The CAN bus interface features high-speed signal isolation and DC-DC power isolation; USB, CAN1, and CAN2 ports are fully isolated from each other.
- Maximum throughput: Supports receiving and transmitting over 8500 frames per second per channel, with both channels operating independently without interference.
- Internal CAN transmission buffer: 20 frames per channel (auto-retransmission on failure); CAN reception buffer: 2000

frames per channel.

●Powered directly by the USB bus, no external power supply required;

●Insulation voltage of isolation module: 2500VDC;

●The CAN1 channel incorporates GDT components; both CAN1 and CAN2 channels feature built-in TVS diodes and common-mode inductors.

●Operating temperature: -20 to 85° C;

●Case dimensions: 10 3×66×25 mm;

●Product compatibility: The function library is compatible with Zhou Ligongs USB CAN-II/USB CAN-2E-U interface adapters.

1.4. Typical application

● Enables transmission and reception of CAN bus network via USB ports on PCs or laptops;

●Rapid data acquisition and analysis via CAN network;

●CAN bus-USB gateway;

●Convert USB interface to CAN network interface;

● Extend the network communication range of the CAN bus;

● CAN network data monitoring in industrial environments.

2. Hardware parameters

2.1. Appearance and Interface

The CAN300 analyzer interface adapter features two external interfaces: a standard USB port and a 6-pin terminal block for CAN bus communication.

pilot lamp :

Red highlight: LED-PWR light indicates power supply.

Blue LED-CAN1 indicates CAN1 interface status. It flashes when receiving or transmitting CAN1 bus data. During USB interface insertion, the system performs self-check and the LED flashes once.

Red LED: The CAN2 indicator light shows CAN2 interface status. It flashes when CAN2 bus data is received or transmitted. During USB interface insertion, the system performs self-check and the CAN2 LED flashes once.

Blue light: SYS indicator. For the USR-CAN300 Professional Edition, if the SYS light remains on for approximately 1 second without successful transmission, the system will cancel the transmission and turn off the light. No dedicated indicator light or hardware switch is provided.

The USR-CAN300s Pro top-tier model: If the SYS indicator fails to transmit within 4 seconds after activation, the transmission is canceled and the indicator turns off. The CAN2 channel features an integrated mode indicator LED, and the fault-tolerant CAN interface includes a dedicated resistor selection switch (560 ohms/5.6kΩ).

2.2. Interface Description

As shown in the interface

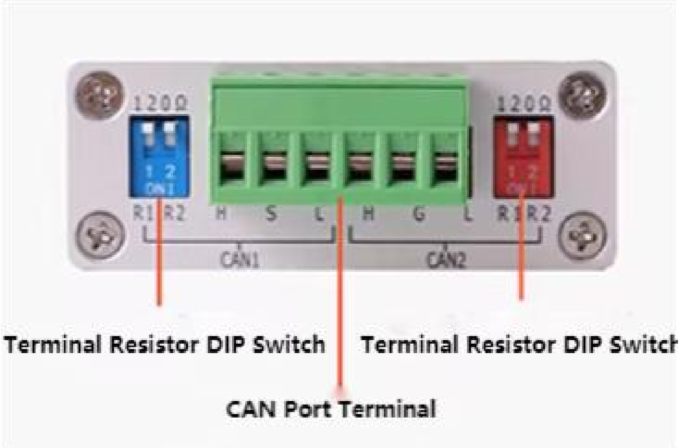

表 1 interface definition

order number	Interface name	function declaration
CAN1 （ high speed ）	R1	Terminal resistor R1. When set to ON, the internal 120-ohm resistor connects to the bus.
	R2	Terminal resistor R2. Connected in parallel with R1, performing the same function. Each channel has two built-in resistors.
	H	CAN1 bus H signal.
	S	Shielded cable interface: if the communication cable is a shielded cable, connect to the shield layer; otherwise, ground it or leave it unconnected.
	L	CAN1 bus L signal.
CAN2 （ high speed ） When configured for high-speed CAN	R1	Terminal resistor R1. When set to ON, the internal 120-ohm resistor connects to the bus.
	R2	Terminal resistor R2. Connected in parallel with R1, performing the same function. Each channel has two built-in resistors.
	H	CAN2 bus H signal.
	S	For CAN signal lines, if the communication cable is shielded, connect to the shield layer; otherwise, ground it or leave it unconnected.
	L	CAN2 bus L signal.
CAN2	R1	When CAN2 channel is configured as low-speed fault-tolerant CAN,

(fault-tolerant) When configured as a fault-tolerant CAN	R2	both R1 and R2 must be set to the high position. Important: Do not insert any resistor between H and L, as this will prevent the fault-tolerant CAN from functioning properly.
	H	CAN2 bus H signal.
	S	The signal ground of fault-tolerant CAN can be left unconnected under normal conditions. pay attention to : 1. When fault-tolerant functionality is required or single-wire CAN is used, the ground and G terminals of the fault-tolerant CAN or single-wire CAN network must be connected together. 2. CAN2 fully supports single-wire CAN communication. When connecting to a single-wire CAN, the CANH pin of the single-wire CAN should connect to CAN2s H pin, and the ground pin of the single-wire CAN should connect to CAN2s G pin.
	L	When CAN2 channel is configured as low-speed fault-tolerant CAN, both R1 and R2 must be set to the high position. Important: Do not insert any resistor between H and L, as this will prevent the fault-tolerant CAN from functioning properly.
pilot lamp	PWR	power light
	SYS	The system status indicator is normally off. It turns on when a bus error occurs.
	CAN1	CAN1 channel indicator (flashes during data transmission/reception)
	CAN2	CAN2 channel indicator light (flashes during data transmission/reception)

operate mode :

CAN send: The adapter receives the data packet from the USB interface of the PC, then immediately parses and saves it into the T-Buffer buffer. The adapter continuously reads from the T-Buffer buffer to form a CAN message frame, which is then sent to the CAN bus interface.

CAN reception: When the adapter receives data from the CAN network, it stores the data in the R-Buffer buffer. Upon receiving a query request from the host computer software, the adapter transmits the buffered data to the USB interface.

3. Product Features Overview

[Note: Version differences]

The USRCAN300 Professional Edition requires no additional factory configuration and only supports high-speed CAN terminal resistor settings. It lacks dedicated software configuration tools and only supports general operations.

The USRCAN300s Top-End Edition features a maximum baud rate of 125Kbps in fault-tolerant CAN mode, with no resistors allowed between HL ports. The default factory resistance for fault-tolerant CAN is 560Ω, requiring no adjustment. It includes a "Pro Fault-Tolerant CAN Configuration Tool" that enables switching between high-speed and low-speed fault-tolerant modes for CAN2 channels, as detailed in Section 3.5.

3.1. Factory configuration

1) The software defaults to a CAN bus baud rate of 1Mbps. Note: The baud rate for fault-tolerant CAN must not exceed 125K.

2) The softwares default acceptance mask register is set to 0xFFFFFFFF, meaning no filtering is applied and it can receive CAN messages with any ID.

3) Terminal resistance setting: Select the corresponding switch to activate the built-in 120-ohm terminal resistor.

Note: A CAN bus must have two 120-ohm terminal resistors to ensure proper operation; otherwise, it may cause malfunction.

Each CAN channel of the adapter is configured with the aforementioned parameters.

To enable the terminal resistor, set the DIP switch to ON.

Connect this device to your PCs USB port using a USB cable.

Run the USB-CAN Tool.exe test program as shown in the figure below.

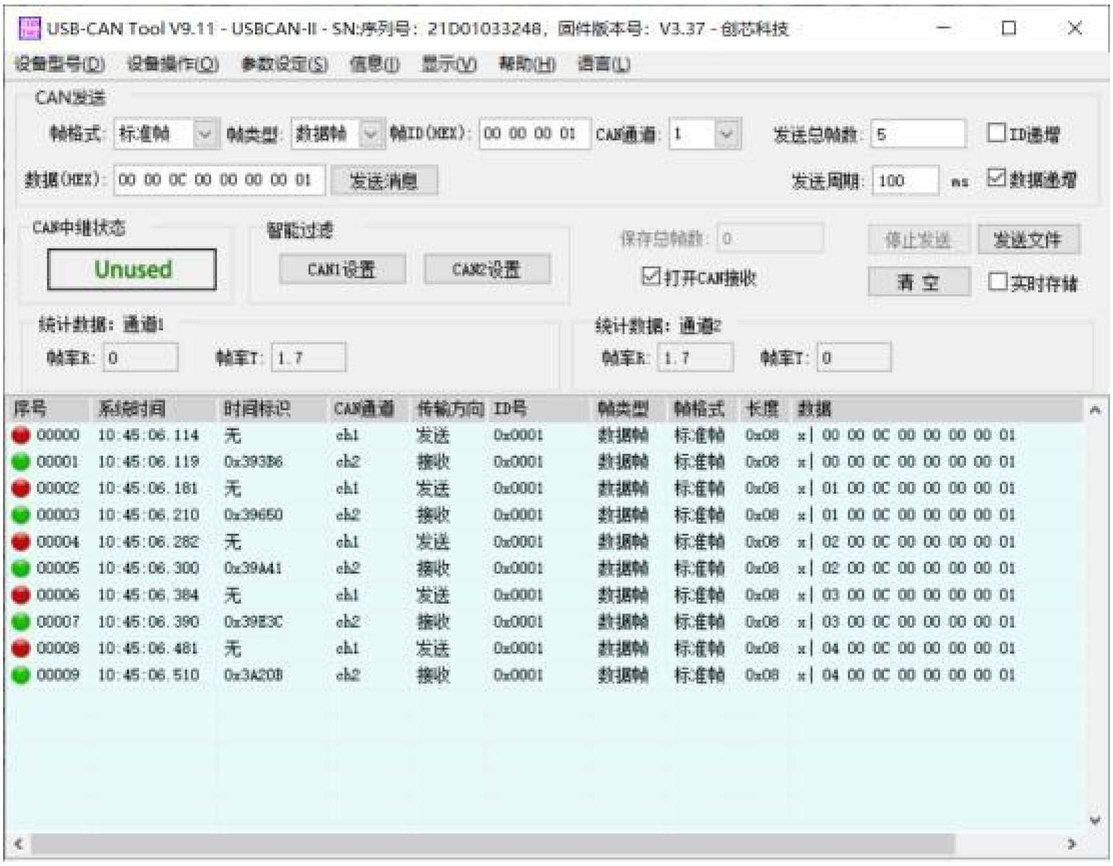

图 1.　testing program

3.2. Software Operation and Function Introduction

1) Select model

In the menu, select Device Model → USB-CAN2.0 and check the box (default).

2) Turn the device on/off

Open the menu Device Operation → Start Device to activate the specified channel of the adapter, or force all channels of the device in USB-CAN Tool to start.

Open the menu Device Operations → Turn off device to disable all channels in the running USB-CAN adapter.

3) CAN parameter configuration

Open the menu "Device Operation" → "Start Device" to open the "Parameter Confirmation" dialog. Configure the baud rate, filtering settings, and operating mode in the dialog. Typically, simply select the desired baud rate from the dropdown list, while keeping other parameters at default. Note that CAN parameters for both channels require separate configuration.

Note: We recommend configuring CAN parameters before connecting the USB-CAN device to the bus. For detailed parameter settings, please refer to the "2. USB-CAN Tool Debugging Software Installation and Usage Manual.pdf".

4) CAN channel selection

Supports two CAN channels (channels 0 and 1). When configuring CAN parameters, select the channel number.

5) CAN baud rate setting

Set to the value required by the user. When communicating with external devices, the baud rate must match that of the external CAN device.

6) Set message filter

Users can filter received CAN messages by configuring filtering methods and setting the values of the Acceptance Criteria Rule (ACR) and Acceptance Message Rules (AMR) filters.

7) Work Mode Settings

Normal operation mode, listen-only mode, self-test (loopback) mode.

Normal operation mode: The CAN module appears on the CAN bus and can send and receive CAN messages.

Listen-only mode: The module appears on the CAN bus but remains passive. It receives messages but neither sends nor responds to them. This mode can function as a bus monitor without interfering with CAN bus data communication.

Self-test (Loop) Mode: This mode enables the adapter to perform self-testing by allowing the CAN module to receive its own messages. In this configuration, the CAN modules transmission path is internally connected to the reception path. The mode provides a "pseudoreponse" to eliminate the need for an external node to provide response bits. CAN messages are not physically transmitted to the CAN bus. The CAN information sent by the adapter can be received back by the adapter. (All our products feature dual-channel capabilities, enabling direct two-channel data transmission and reception testing.)

8) Send CAN message

When transmitting data, select the frame type (extended or standard) and frame ID, along with data length and content. In CAN test software, enter hexadecimal values in the ID and data fields, with spaces between each value. During transmission, the ID field can display up to 4 values, while the data field can display up to 8 values.

Note: To prevent data loss during transmission, USB-CAN devices feature an auto-retransmission mechanism. When a USB-CAN device is disconnected from the CAN bus or its baud rate is incompatible with the bus, it will automatically resend data until either the data is received by another CAN bus node or the device powers down and restarts. Each channel has a buffer capacity of approximately 20 frames. If a transmission fails (auto-retransmission), the host computer will return 0 to indicate failure until the buffer data is successfully transmitted. The system includes a timeout feature, where frames not transmitted within 1 second will be automatically cleared and no further retransmission will occur.

9) ID format for sending and receiving

Direct ID format: Align the least significant bit (Bit0) of the ID with the Bit0 of the ID byte. If ID=2, enter 00 00 00 02 directly in the ID field. This format is intuitive and simple.

3.3. back to back

Each CAN channel supports self-test function.

The test steps are as follows:

1) Connect the device to the PCs USB port and launch the USB-CAN Tool software;

2) In the software menu, select Device Operation and choose Start Device. Then in the Parameter Confirmation dialog box, change the working mode to Self-test (Loop) mode, and leave other parameters at their default values.

3) Click the "Send" button to transmit the CAN data. Check if the transmitted information is successfully received, which will be displayed in the data area.

For dual-channel CAN debuggers, it is recommended to perform direct data transmission tests between CAN1 and CAN2 channels, which can fully detect all faults of the CAN debugger.

The CAN300 features a dual-channel CAN interface, allowing users to connect the CANH and CANL channels for two-channel data transmission and reception testing. This comprehensive approach directly identifies faults in the CAN transceiver. Refer to the documentation "5. Plug-in 1: USB－CAN Bus Adapter Testing.pdf" for detailed instructions.

point out ：

If the above steps fail, check the steps carefully. If the issue persists, contact the manufacturer.

If the USBCAN adapter fails to receive data after rebooting, you may try restarting the USB-CAN Tool test software or restoring factory settings.

When debugging external CAN devices with an adapter, connect USBCANs CANH and CANL to the corresponding external CAN devices CANH and CANL, while leaving other wires unconnected.

3.4. Multiple USB-CAN devices are in use

The USB-CAN Tool supports connecting over 10 USB-CAN bus adapters to a single computer simultaneously. For detailed instructions, please refer to "12. Appendix 5: Multi-Card Same-Computer Operation Manual.pdf".

Note: For detailed instructions on using the USB-CAN Tool, please refer to: "2. USB-CAN Tool Debugging Software Installation and Usage Manual.pdf".

3.5. The CAN2 channel configuration of CAN300s analyzer (top version)

1、Configuration: The CAN2 channel of the CAN300s analyzer (top-tier Pro version) can be configured via software to operate as either high-speed CAN or low-speed fault-tolerant CAN. The configuration software is as follows:

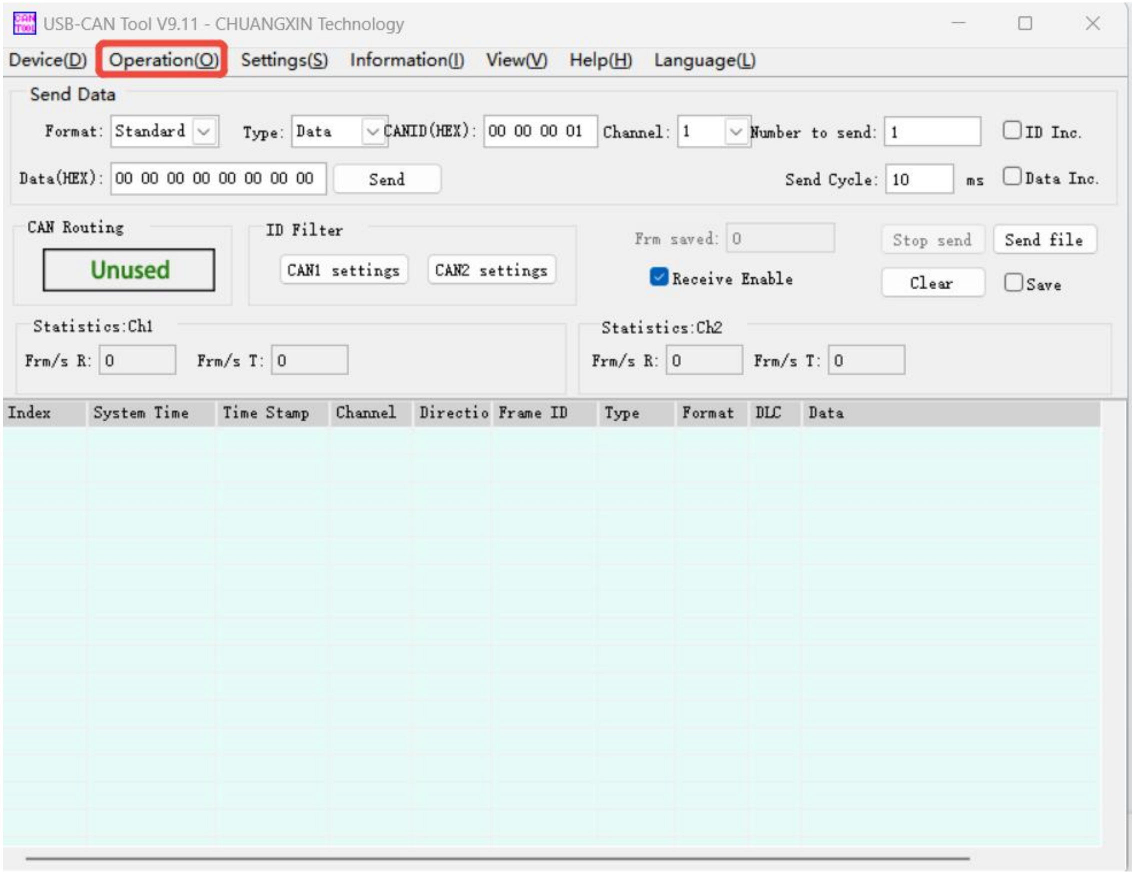

图 2.　fault-tolerant CAN configuration

Click Start Device to view the current status of the CAN2 channel in the upper-left corner of the plugin interface.

On the right, in the CAN2 channel settings area, you can configure it as high-speed CAN or low-speed fault-tolerant CAN. Click settings, and the system will restart automatically. The changes take effect immediately. Click close device to exit. The configuration state will be saved until you manually configure it again.

图 3.　Enable fault-tolerant CAN

2、LED status indicator: When the CAN2 channel is configured in low-speed fault-tolerant CAN mode, an internal LED light is activated.

①. No internal lighting: The CAN2 channel is configured as high-speed CAN.

②. Pure green light: The CAN2 channel is configured as a low-speed fault-tolerant CAN

③. Orange light: Hardware fault in CAN2 channel (e.g., resistor in the HL circuit). This is one of the nine common fault modes in fault-tolerant CAN systems.

3、Fault-tolerant CAN resistor selection: The device features a built-in CAN-specific resistor switch with 560Ω/5.6kΩ options, defaulting to 560Ω. This setting accommodates all standard applications without requiring user configuration.

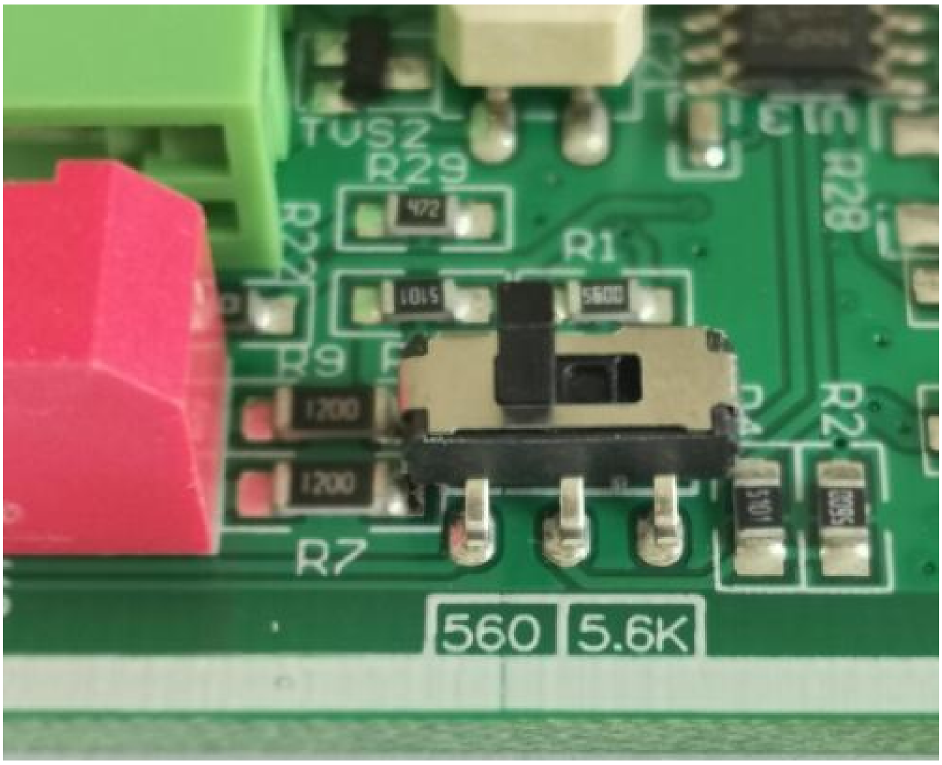

图4. CAN resistance

4. Contact way

Company:Jinan USR IOT Technology Limited

Address : Floor 12 and 13, CEIBS Alumni Industrial Building, No. 3 Road of Maolingshan, Lixia District, Jinan, Shandong, China

Official website: https://www.pusr.com

Official shop: https://shop.usriot.com

Technical support: http://h.usriot.com/

Email : sales@usriot.com

Tel : +86-531-88826739

Fax : +86-531-88826739-808or 0531-66592361

Positioning: Trusted Smart Industrial IoT Partner

Some people have a vision: to become an ecological enterprise in the field of industrial Internet of Things

Some people have a mission: to connect value and value connection

Values: Integrity, Diligence, Critical Thinking, Seriousness, Innovation, Trust, Responsibility, Customer Service, Respect for Heaven and Love for People

Product Philosophy: Reliable, User-Friendly, and Affordable

Corporate Culture:Someone is doing something seriously

5. Disclaimer

This document provides information regarding the USR-CAN300 series products. It does not grant any intellectual property rights, either express or implied, nor does it constitute a license to prohibit speech or other forms of intellectual property rights. Except for the liability stated in the sales terms and conditions of the products, our company assumes no other liabilities. Furthermore, our company makes no express or implied warranties regarding the sale and/or use of these products, including warranties of suitability for specific purposes, marketability, or liability for infringement of any patents, copyrights, or other intellectual property rights. Our company reserves the right to modify product specifications and descriptions at any time without prior notice.

6. Update History

Documentation Edition	Update content	refresh time
V1.0	editio princeps	2025-11-25
V1.1	CAN300/CAN300s specification	2026-03-02

Your Trustworthy Smart IOT Partner

Official Website: www.pusr.com
Official Shop: shop.usriot.com
Technical Support: h.usriot.com
Inquiry Email: inquiry@usriot.com
Skype & WhatsApp: +86 13405313834

Click to view more: Product Catalog & Facebook & Youtube