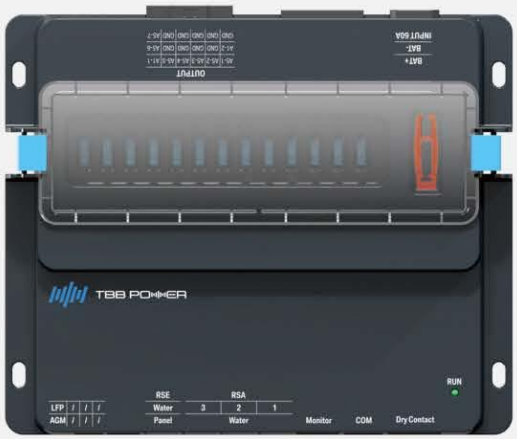
TBB POWER

Version:A1.0

Distribution Module User Manual

CRS29A



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Preface

Thank you for choosing the CRS29A distribution module produced by our company. It is designed to be safe, reliable, and easy to use. Please carefully read this manual, which includes information on safe installation and operation, as well as the electrical performance and protection features. This will help you get the most out of the product's lifespan and service. Please strictly follow all warnings and instructions in this manual and on the machine, and keep this manual in a safe place.

The installation, operation, and maintenance of this product should be performed by trained technical personnel and should adhere to the following requirements:

1. Ensure that the DC voltage connected to the product matches the product's nominal operating voltage.

2. Ensure the correct and secure connection of the product's DC input terminals to the battery's positive and negative terminals. Reverse connections are strictly prohibited.

3. If the product is used in non-vehicle applications, ensure proper grounding.

4. Keep the connection between the product and the battery as short as possible. Ensure that input and output wiring is correct and secure, while also avoiding short circuits in the connection lines.

Disclaimer：

Due to continuous product and technology updates, the content in this document may not fully match the actual product. Please understand. For product updates, please contact us.

Table Content

Chapter 1: Safety Instructions

1.1 Safety Instructions

- Please pay attention to the safety signs on this product and in the manual.
- During installation, operation, and maintenance, it is essential to follow electrical safety standards and operational procedures to prevent personal injury or equipment damage. The safety precautions mentioned in this manual are supplemental to local safety regulations.
- The manufacturer is not responsible for any damage caused by violating general safety operational requirements or safety standards for equipment usage.
- The following icons appear throughout the manual to indicate potential hazards or important safety instructions:


This operation/function is critical to the system's normal operation. Please handle with care!

1.2 General Safety Precautions

- The product must not be exposed to water, fog, snow, or dust.
- To avoid fire and electric shock, ensure all cables have good electrical characteristics and appropriate gauge; do not use damaged or undersized cables.

Chapter 2: Product Introduction

2.1 Product Overview

The CRS29A distribution module's main functions are load switching and water level sensor collection control. It sends relevant information to various modules via a bus and works with the human-machine interface to achieve low power consumption. It supports external A7 screen wake-up and cascade panel wake-up functions. It features 9 controllable output channels and supports a wide voltage input of 9-32V.

2.2 Working Principle

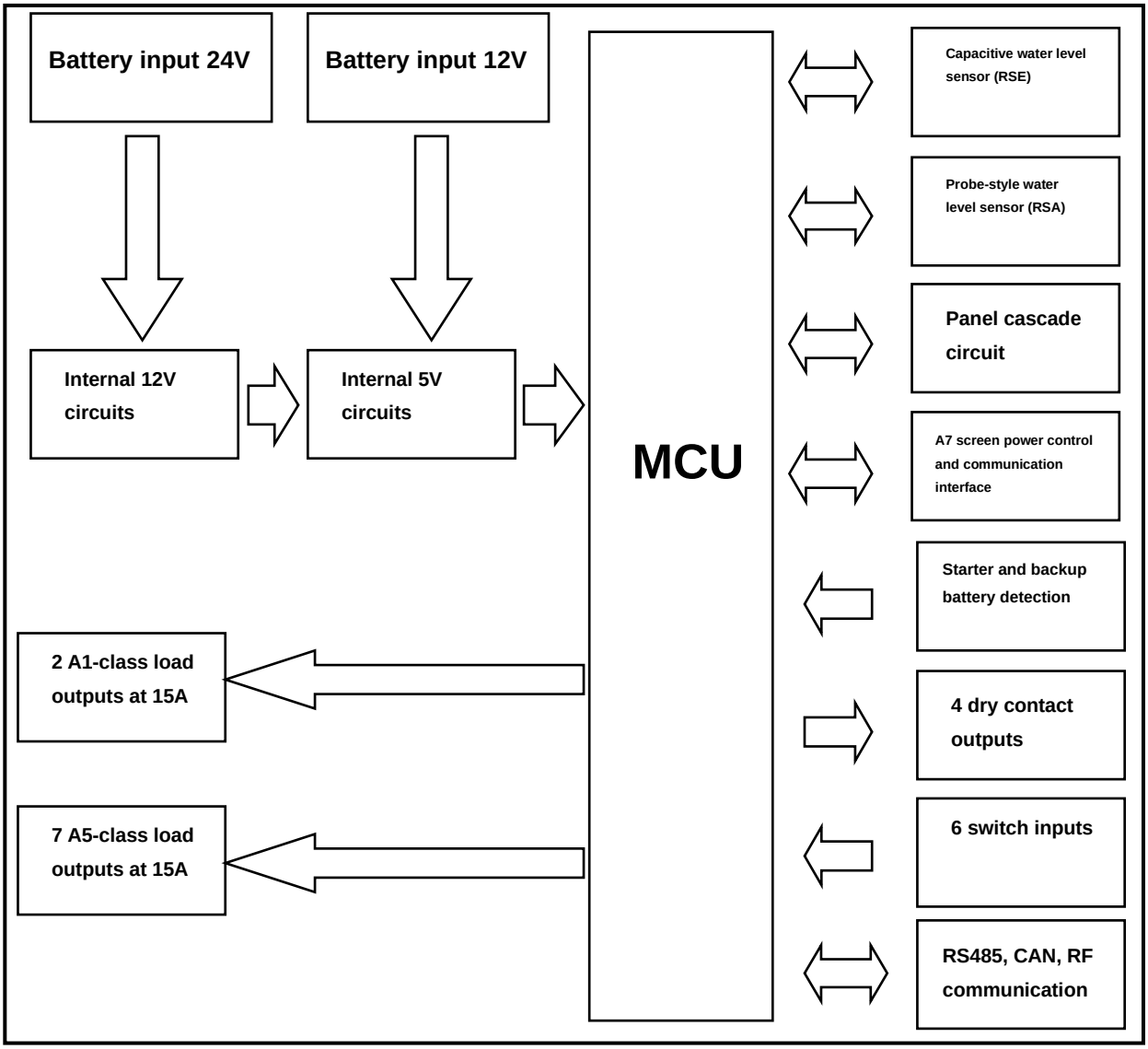


Figure 2-1 Product Working Principle Diagram

2.3 Product Appearance and Dimensions

2.3.1 Product Appearance

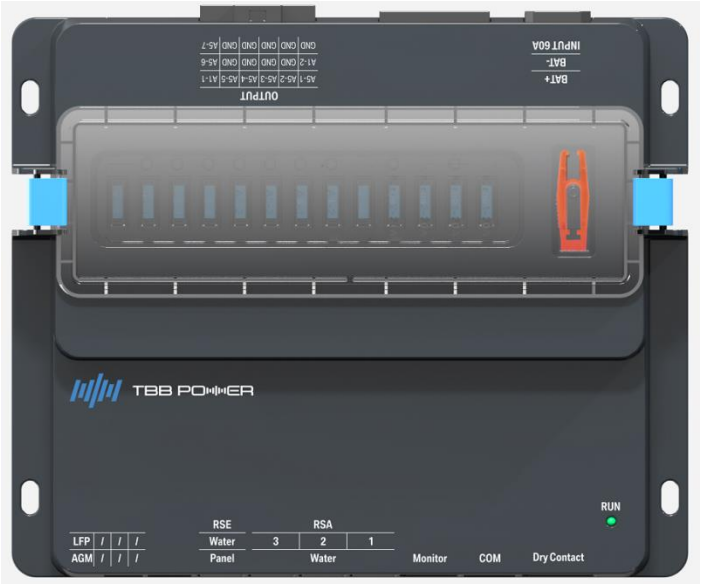


Figure 2-2 Product Appearance

2.3.2 Host Installation Cutout Diagram

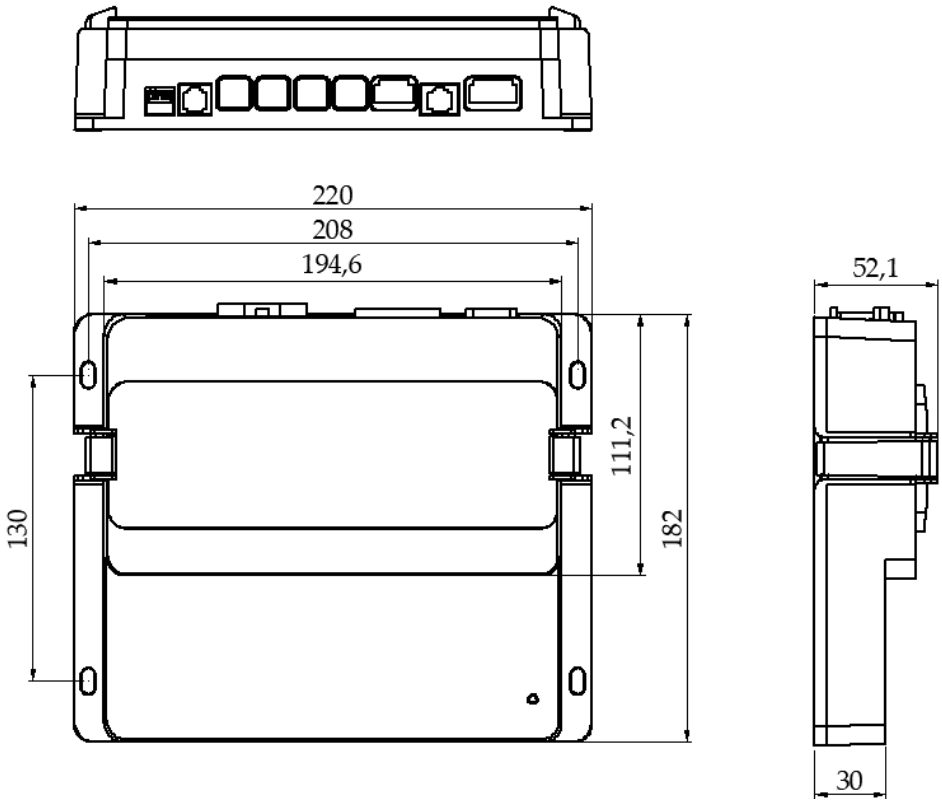
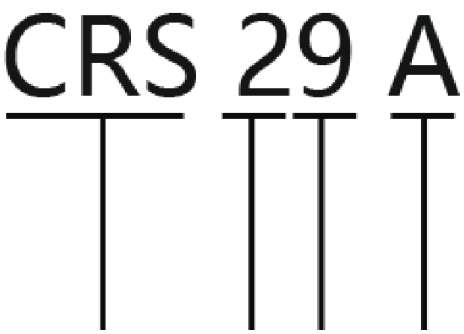


Figure 2-3 Installation Cutout Dimensions

2.4 Naming Convention



Character	Description
CRS	CRS29 Series Distribution Module
2	2 types of input voltage: 9-16V/16-32V
9	9 output channels
A	2 A1-class outputs, 7 A5-class outputs

2.5 Features and Functions

2.5.1 Output

- The CRS29A distribution module has 9 outputs.
- CRS29A has 2 A1-class load outputs (with bypass fuses) and 7 A5-class load outputs.
- Each output supports a 15A plug-in fuse, but each channel can only support a maximum current of 10A.
- There are 9 LED indicators to show the current abnormal status of the output channels.
- The total output current supports up to 60A.

2.5.2 Supports an input/output voltage range of 9V to 32V DC.

- If the input voltage is 9-16V, it is identified as a 12V system, using the input power for relay and output power.

- If the input voltage is 16-32V, it is identified as a 24V system, and the system uses 12V from a DC-DC conversion circuit for relay power. Input power is used for output supply. The system will shut down the output if the input voltage exceeds 32V.

2.5.3 CAN Communication

- Used for communication with an upper computer or other modules.

2.5.4 RF Communication

- RF communication allows the module to communicate with wireless switch panels, pairing buttons with output channels for remote control.
- The module can support up to 12 wireless switch panels.
- The CRS29A supports the following wireless switch panel models: PICO2BX, PICO3BX, WMSP2BX.

2.5.5 RS485

The module provides an RS485 interface.

2.5.6 Dry Contact Output

Equipped with 4 passive dry contact output interfaces.
The dry contact output states are as follows:

Function	Dry Contact State
OFF	Open Circuit
ON	Short Circuit

Table 2-1 Dry Contact Output States

2.5.7 Module DIP Switch Settings

The module has a 4-position DIP switch:

- Position 1: Used to distinguish battery types.

- Positions 2, 3, 4: No function.

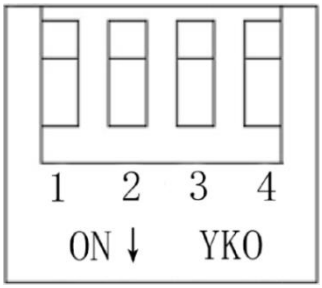


Figure 2-4 DIP Switch Diagram

Table 2-1 Function Operation

Switch Number	Switch Definition	Notes
1	Up (OFF): LFP, Down (ON): AGM	LFP: Lithium Battery, AGM: Lead-Acid Battery
2	/	/
3	/	/
4	/	/

2.5.8 Output Channel Control Methods

The output channels can be controlled in three ways:

- RF Wireless Panel Control
- RS485 or CAN Communication, using the upper computer for control.
- Cascade Communication, using a 12V cascade panel for control.
- The system can also control channels via the PCU (Power Control Unit).

2.5.9 Protection Mechanisms

- Reverse polarity protection.
- Each output channel is equipped with a corresponding plug-in fuse.
- Input over-voltage protection.
- Fuse open-circuit alarm.

Table 2-6 Fuse Open-Circuit Indicator States

	Off	On
Indicator Status	Fuse intact or channel not activated	Fuse blown or load short-circuited

2.5.10 Switch Inputs

The module is equipped with 6 switch input detection interfaces.

2.5.11 Water Level Sensor Detection

Table 2-7 Water Level Sensor Configuration

Model	RSA Sensor Ports	RSE Sensor Ports
CRS29A	3 RSA Ports	1 RSE Port

RSA、RSE Hybrid:

1. The CRS29A distribution module determines if an RSA sensor is connected by checking whether the voltage detected at each tank matches the set voltage.
2. The module periodically queries RSE data and checks for incoming RSE water level data to confirm RSE sensor connections.
3. When both RSA and RSE sensors are used for the same tank, the data from the RSE sensor takes precedence and RSA data is not displayed for that tank.

2.5.13 Operating Status Indicator

The module is equipped with a status indicator light to display the current operating state.

Table 2-8 Operating Status Indicator States

	Light Color	Slow flashing	Off
Operating State	Green	Operating normally	Operating abnormally

2.5.14 Sleep Power Consumption

The sleep power consumption is less than 3mA.

2.6 Terminal Definitions

2.6.1 INPUT 60A Terminal Pin Definitions

Table 2-8 INPUT 60A Terminal Pin Definitions

PIN NO	PIN Definitions	polarity	Voltage Range (V)	Remarks
BAT+	House battery +	Power input	9-32V	Product power positive

		positive		input
BAT-	House battery -	Power input negative (GND)	GND	Product power negative input

2.6.2 OUTPUT Terminal Pin Definitions

Table 2-9 OUTPUT Terminal Pin Definitions

PIN NO	PIN Definitions	Polarity	Voltage Range (V)	Remarks
1	A5-1	Power output	9-32V	15A relay-controlled output
2	A1-2	Power output	9-32V	15A relay-controlled output
3	GND	GND	0V	GND
4	A5-2	Power output	9-32V	15A relay-controlled output
5	GND	GND	0V	GND
6	GND	GND	0V	GND
7	A5-3	Power output	9-32V	15A relay-controlled output
8	GND	GND	0V	GND
9	GND	GND	0V	GND
10	A5-4	Power output	9-32V	15A relay-controlled output
11	GND	GND	0V	GND
12	GND	GND	0V	GND
13	A5-5	Power output	9-32V	15A relay-controlled output
14	GND	GND	0V	GND
15	GND	GND	0V	GND
16	A1-1	Power output	9-32V	15A relay-controlled output

17	A5-6	Power output	9-32V	15A relay-controlled output
18	A5-7	Power output	9-32V	15A relay-controlled output

2.6.3 Dry Contact Terminal Pin Definitions

Table 2-10 Dry Contact Terminal Pin Definitions

PIN NO	PIN Definitions	Remarks
1	RY_1_N0	Dry Contact Output 1
2	RY_1_COM	
3	RY_2_N0	Dry Contact Output 2
4	RY_2_COM	
5	RY_3_NO	Dry Contact Output 3
6	RY_3_COM	
7	RY_4_NO	Dry Contact Output 4
8	RY_4_COM	
9	+5V	DC5V
10	INPUT_1	Switching Input 1
11	INPUT_2	Switching Input 2
12	INPUT_3	Switching Input 3
13	INPUT_4	Switching Input 4
14	INPUT_5	Switching Input 5
15	INPUT_6	Switching Input 6
16	+ExBAT	Start battery sampling signal

2.6.4 COM Terminal Definitions

Table 2-11 COM Terminal Definitions

PIN NO	PIN Definitions
1	/
2	/
3	RS485 A+
4	CANH
5	CANL
6	RS485 B-
7	/
8	/

2.6.5 Monitor Terminal Definitions

Table 2-12 Monitor Terminal Definitions

PIN NO	PIN Definitions
1	
2	RS485 A+
3	RS485 B-
4	
5	CANL
6	CANH
7	GND

8	GND

2.6.6 RSA-1/2/3 Terminal Definitions

Table 2-13 RSA-1 Terminal Definitions

PIN NO	PIN Definitions
1	/
2	WaterLa0
3	WaterLa1
4	WaterLa2
5	/
6	VCC5V
7	WaterLa_NC
8	WaterLa3

2.6.9 RSE Terminal Definitions

Table 2-16 RSE Terminal Definitions

PIN NO	PIN Definitions
1	/
2	Clock_Water-1
3	DATA_Water-1
4	VDD12V-1
5	/
6	Clock-1

7	Data-1
8	+12V-1

Chapter 3: Product Installation

3.1 Unboxing Inspection

After unboxing, check whether the equipment has been damaged during logistics and ensure that all accessories are included. Properly store all spare parts for future installation, upgrades, or maintenance.

3.2 Packing List

This series of products includes the following components: One CRS29A host.

3.3 Wiring Preparation

The user must prepare their own DC input and output cables, as well as communication and control sampling signal cables. The cables should use the BVR model.

Table 3-1 Cable Selection Reference Table

Model	DC Input Cable Gauge	DC Output Cable Gauge
	mm^2	mm^2
CRS29A	10	2.5

3.4 Installation Environment Inspection

The equipment should be installed in a location with sufficient ventilation, cool temperatures, low humidity, and clean air conditions, free from dust.
Keep the equipment away from fire sources and avoid direct sunlight or rain. The working environment must not store flammable, explosive, or corrosive gases or liquids. The equipment must not be installed in environments containing conductive metallic dust.

Operating Temperature: -20°C to +60°C

Storage Temperature: -40°C to +85°C

Altitude: Up to 2000 meters

Relative Humidity: 0%-95% non-condensing

3.5 Installation Recommendations

The equipment should be placed in an environment that meets the storage requirements, and the storage time should not exceed 3 months. The equipment should be transported to the installation site before removing the packaging.

- Ensure the equipment's switch is in the off position and install it without power.
- Before wiring, confirm that the DC input voltage meets the rated parameters.
- Follow the terminal markings for wiring, as incorrect wiring can cause equipment damage.

Chapter 4: Operation Introduction

4.1 Power-On Inspection and Instructions

1. Check if the input voltage matches the CRS29A's markings. Do not use the equipment if there is a mismatch, as it may damage the CRS29A. If unsure, consult the supplier or the manufacturer.

2. Verify that the input wiring is correct before powering on. Ensure that the positive and negative terminals are not reversed.

3. Ensure the wiring is correct and secure, and confirm there are no short circuits.

4. Check that the CRS29A is securely installed.

5. After verifying all the above steps, power on the equipment.

4.2 Indicator Light Definitions

4.2.1 CRS29A Operating Status Indicator Light States

Table 4-1 Operating Status Indicator Definitions

Indicator #	Indicator Name	Color	Status Description
1	Operating Indicator	Green	Slow flash: Normal operation. Off: Faulty operation

4.2.2 CRS29A Output Channel Fuse Blow LED Indicator Light Status

Table 4-2 Fault Indicator Status

Indicator #	Color	Indicator Status	Description
1	Red	Constant On	Fuse blown or load shorted

Chapter 5: Common Fault Analysis

5.1 Power Indicator Not Lit

Fault 1: Power indicator not lit and communication between module and system fails.
Possible Cause: Incorrect power wiring.
Solution: Check if the power wiring is correct.

Fault 2: Power indicator lights up after startup but then turns off, and communication between module and system fails.
Possible Cause: Faulty dry contact input signal.
Solution: Check if the dry contact input signal is functioning properly.

Fault 3: The module stops working suddenly during use, and the indicator is not lit.
Possible Cause: Power circuit failure.
Solution: 1. Check if the 12V to 5V DC-DC chip output is within 5V ±0.5V. 2. Check if pin 2 of Q24 has a voltage level of 4.8V ±0.5V.

5.2 Normal Communication but No Output

Fault 1: Fuse blow indicator light turns on, and there is a relay clicking sound.
Possible Cause: Blown fuse.
Solution: Check if the fuse is blown or if there is a load short circuit.

Chapter 6: Technical Specifications

#	Performance Parameters	
1	Operating Voltage	12V System: 9V~16V
		24V System:16~32V
2	Total Output Current	60A
3	Single Output Current	⩽10A
4	Number of Output Channels	2 A1-class, 7 A5-class
5	Number of Switch Inputs	6 Switch Inputs
6	Number of Dry Contact Outputs	4 Dry Contact Outputs
7	Communication Methods	RF, CAN, RS485
		CAN Communication, Product External Communication
		RS485 Communication
8	Water Level Sensors	1 RSE and 3 RSA
9	Operating Environment	Altitude: 2000m
		Temperature: -20°C~60°C

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