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RHF2SG03 Smart Circuit Breaker Gateway

V1.0



Document information

Info	Content
Keywords	<i>RHF2SG03 smart Circuit Breaker Gateway, RS485,</i>
Abstract	This manual describes the technical specifications and standards of the RHF2SG03 Smart Circuit Breaker Gateway.

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1 Overview

The RHF2SG03 Smart Circuit Breaker Gateway is a wireless gateway designed to connect and control RS485 circuit breakers, catering to industrial or consumer site applications. It aims to ensure efficient operation of power systems, electrical safety, and energy-saving as well as emission reduction.

The primary functions of the smart circuit breaker gateway include electricity data collection (such as energy consumption, active power, power factor, voltage, current, and leakage current). Additionally, it can control the closing and opening of circuit breakers through remote commands, local rule-based control, and environmental linkage control.

The gateway connects to circuit breakers via an RS485 interface and uses Cat 1 network access to integrate with a system management platform. This enables device management, data management, remote control, and remote firmware upgrades.

The smart circuit breaker gateway is powered by a 220V supply, with an operating power consumption of less than 4W. It operates within a temperature range of -40°C to 85°C and features an ABS plastic enclosure. With dimensions of 100 x 36 x 67 mm, it is easy to install and supports rail-mounted installation within distribution boxes.

1.1 Product Technical Features and Application Fields

Features:

- ◆ **Network Communication Method :** 4G Cat-1
- ◆ **LTE Cat.1 band:**
 - LTE-FDD: Band1/3/5/8
 - LTE-TDD: Band34/38/39/40/41
- ◆ **Network Transmission Protocol:** MQTT for platform connection management
- ◆ **Antenna:** External 4G magnetic base antenna or stick antenna
- ◆ **SIM Card:** Push-pull pluggable SIM card slot (Micro-SIM)
- ◆ **Temperature Sensing Interface:** Supports external NTC resistor for flexible environmental temperature monitoring (reserved feature)
- ◆ **Smart Circuit Breaker Interface:** RS485 interface with configurable serial baud rate

◆ **Smart Circuit Breaker Gateway and Breaker Binding Maintenance:**

The smart circuit breaker gateway supports RS485 interface connections for cascading up to 247 smart circuit breakers, with prior binding required. (RS485 slave addresses of circuit breakers must not be duplicated).

◆ **Smart Circuit Breaker Protocol:**

Supports Modbus-RTU protocol, DL/T 645 protocol, and expandable protocols. When encountering unknown circuit breakers, it can perform online upgrades to configure point tables and directly expand connections with breakers.

◆ **Circuit Breaker Monitoring:**

Monitors the circuit breaker's online status, open/close state, closing operation duration,

phase line temperature, phase voltage, phase current, leakage current, phase power factor, phase active power, total power, phase active energy, and total active energy. Accuracy: Class 1 (error limit <1%).

◆ **Circuit Breaker Control:**

Supports remote command control to open/close breakers via the management platform, local timed rule-based control, and environmental smart linkage control.

◆ **Alarm Reporting:**

Supports flexible definition of alarm events on the management platform. Once alarm conditions are triggered, the gateway reports the event.

◆ **Remote Self-Testing:**

The circuit breaker gateway can perform remote self-testing of breakers via the management platform.

◆ **Remote Configuration and Monitoring:**

The gateway supports remote configuration, remote monitoring, and OTA remote firmware upgrades.

◆ **Power Failure Detection:**

The gateway includes a power failure detection function. After a power outage, it uses residual power to report the downtime and other information.

◆ **LLED Indicators:**

Power indicator, system indicator, RS485 interface working indicator.

◆ **LCD Display:**

Displays circuit breaker operating parameters.

◆ **Peak Power Consumption:**

Less than 8W (MAX), stable power consumption less than 4W.

◆ **Electrostatic Discharge (ESD) Protection:**

Contact discharge $\pm 4\text{kV}$, air discharge $\pm 8\text{kV}$.

◆ **Operating Temperature Range:**

-40°C to 85°C .

◆ **Mounting Method:** Rail mounting.

◆ **Protective Grounding:**

The protective grounding terminal connects to earth.

2 Product Specifications

This section describes the technical specifications and performance characteristics of the product. Unless otherwise specified, the following specifications are based on standard room temperature and a power supply condition of 220V AC.

2.1 Product Technical Specifications Overview

Table 1 RHF2SG03 Product Technical Specifications Overview

Item Group	Item	Function Description
Mechanical Specifications	Product Dimensions	100*36*67mm
	Net Weight	125g
Communication Method	Network Communication	4G Cat-1
	Interfaces	2 x RS485
		1 x NTC Temperature Detection
Electrical Performance Indicators	Power Supply:	Line-powered
	Supply Voltage	220 VAC $\pm$ 10%
	Typical Service Life	5 years
	Maximum Power Consumption	8W (MAX)
	Stable Power Consumption	4W
Protocols	LTE Cat.1 band	LTE-FDD: Band1/3/5/8
		LTE-TDD: Band34/38/39/40/41
	Device Communication Protocol	Supports Modbus/645 protocol
Display Method	LCD Dot Matrix Display	Displays breaker voltage, current, etc.
Temperature Detection	Measurement Range	-40°C~85°C
	Measurement Accurac	$\pm$ 1°C (measured at 25°C)
Antenna Interface	SMA Antenna Interface	External 4G Short Stick / Magnetic Base Antenna
SIM Card	External Interface	1 x push-pull pluggable SIM card slot (Micro-SIM)
Status Indicators	LED	1*LED Power Indicator 1*LED Communication Status Indicator 1*LED 4G Status Indicator
Working Environment	Operating Temperature Rang	-20 to +70°C (LCD) -40 to +85°C (Overall Functionality)
	Storage Temperature Range	-40 to +85°C
Installation	Mounting Method	Standard 35mm rail mounting

2.2 Product Reliability Performance Specifications

2.2.1 Environmental Testing Compliance

Table 2 Environmental Testing Compliance

Item	Condition	Standard	Result
Low Temperature Operation	Temperature: -40°C Operating Mode: Device running normally Test Duration: 12 hours	JESD22-A1 GB/T 2423	Appearance: Good Communication: Normal Other functions: Normal
High Temperature Operation	Temperature: 85°C Operating Mode: Device running normally Test Duration: 12 hours	JESD22-A1 GB/T 2423	Appearance: Good Communication: Normal Other functions: Normal
Low Temperature Storage	Temperature: -40°C Operating Mode: Device powered off Test Duration: 24 hours	JESD22-A1 GB/T 2423	Appearance: Good Communication: Normal Other functions: Normal
High Temperature Storage	Temperature: 85°C Operating Mode: Device powered off Test Duration: 24 hours	JESD22-A1 GB/T 2423	Appearance: Good Communication: Normal Other functions: Normal

2.2.2 EMC Performance Specifications

Table 3 EMC Performance Specifications

Item	测试 Standard	Result
ESD	IEC 61000-4-2	Air Discharge: ±15kV Contact Discharge: ±8kV
Surge	IEC 61000-4-5	Common Mode: ±6kV Differential Mode: ±3kV

2.3 Mechanical Dimensions

Mechanical Dimensions: 100 x 36 x 67 mm

Net Weight: 123 g

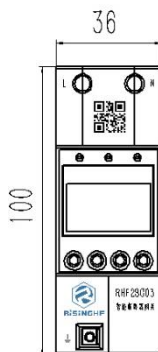


Figure 1 RHF2SG03 Main Unit Mechanical Dimension Diagram

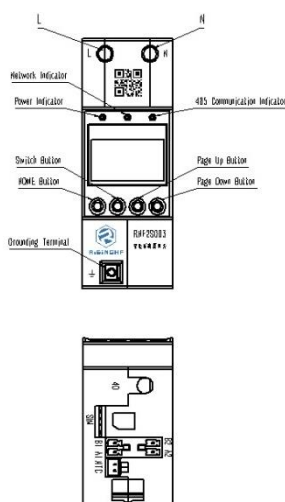


Figure 2 Interface Function Definition

3 Ordering Information

The ordering model information is as follows:

Table 4 RHF2SG03 ordering information

Model Number	Description
RHF2SG03	Smart Circuit Breaker Gateway

For detailed orders, please contact via email:

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Revision History

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+ First Draft

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