Outdoor IP68 Compact Modbus RS485 to CAT M1 / NBIoT Gateway

SCB111-485-DC/ SCB111-485-SMA

Outdoor Compact RS-485 to NB/Cat.M1 Gateway

The SCB111-485-NB-DC gateway enables communication between RS485 RTU devices and cloud servers via CAT M1 or NB-IoT networks. It transmits data securely in JSON format using the MQTT protocol with AES128-bit encryption. Supporting three modes—standard, power-saving sleep, and alert—it adapts to various IoT needs. Configurable via MicroUSB and Windows utility, the gateway connects up to 20 Modbus slave devices, polls 30 Modbus registers, and sends data to the cloud in four MQTT messages. Compact and IP68-rated, it operates in harsh outdoor conditions (-40 to 70˚C). Both internal and external antennas are supported for flexible deployment, and remote firmware updates (ThingsMaster OTA/FOTA) simplify large-scale operations.

IP68 NB-IoT LTE Cat M1 MQTT AWS Modbus ThingSpeak ThingsMaster OTA

Features & Benefits

4G LTE /IoT Communication

- LTE NB1/2, Cat-M1
- LTE- FDD: B1/3/4/5/8/12/13/14/18/19/20/25/26/27 /28/66/71(Global Band) /85
- GSM850, EGSM900, DCS1800, PCS1900
- Build-In Spring-Type ANT. / SMA for external ANT.
- LTE Signal Indication: RSSI, SINR, RSRP, RSRQ

RS485 Connection, Relay DO

- One 2-wire RS485-A, RS485-B
- Modbus Function Code: 01,02,03,04,05,06
- Register Data Type: Unsigned Int/Int, Unsigned Short/Short, Float, ASCII for function Code 03,04
- RTU Serial Baud Rate: 1200~9600bps
- One Dry Relay Control for Ext. Device Power-Up
- Spring Type, Screw-less cable connector
- Modbus Polling with DMA access, prevent RTU Device Polling Time-Out

Multiple Op. mode, Ind. Application

- Standard, Sleeping power saving, Alert Quick reporting with threshold setting
- Outdoor IP68 Weatherproof Enclosure
- -40 ~ 70˚C / 90%H Environment Operating Temperature
- Compliance IEC 61000-6-2/-6-4 Heavy Industrial EMC

Windows© Configuration Tools

- Configuration through USB interface
- Menu type, Non-Install Utility Tool
- Multifunction Set/Test: Base Station, Cloud Server, RTU
- Modbus Device, Register Setting- 20 Devices, 140 Registers (Max), 70 Registers (Floating Data Format), Byte-Swapping
- USB, Serial Com port simulation
- 100 event logs- System Power on (Sys_on), Base-Station Fail (BS_F), , Server Fail (S_F)
- Text Configure file Download / Upload
- Far-End Device Alive Check – ICMP Ping at GSM Mode

Screw-less wiring, Wide Range Power

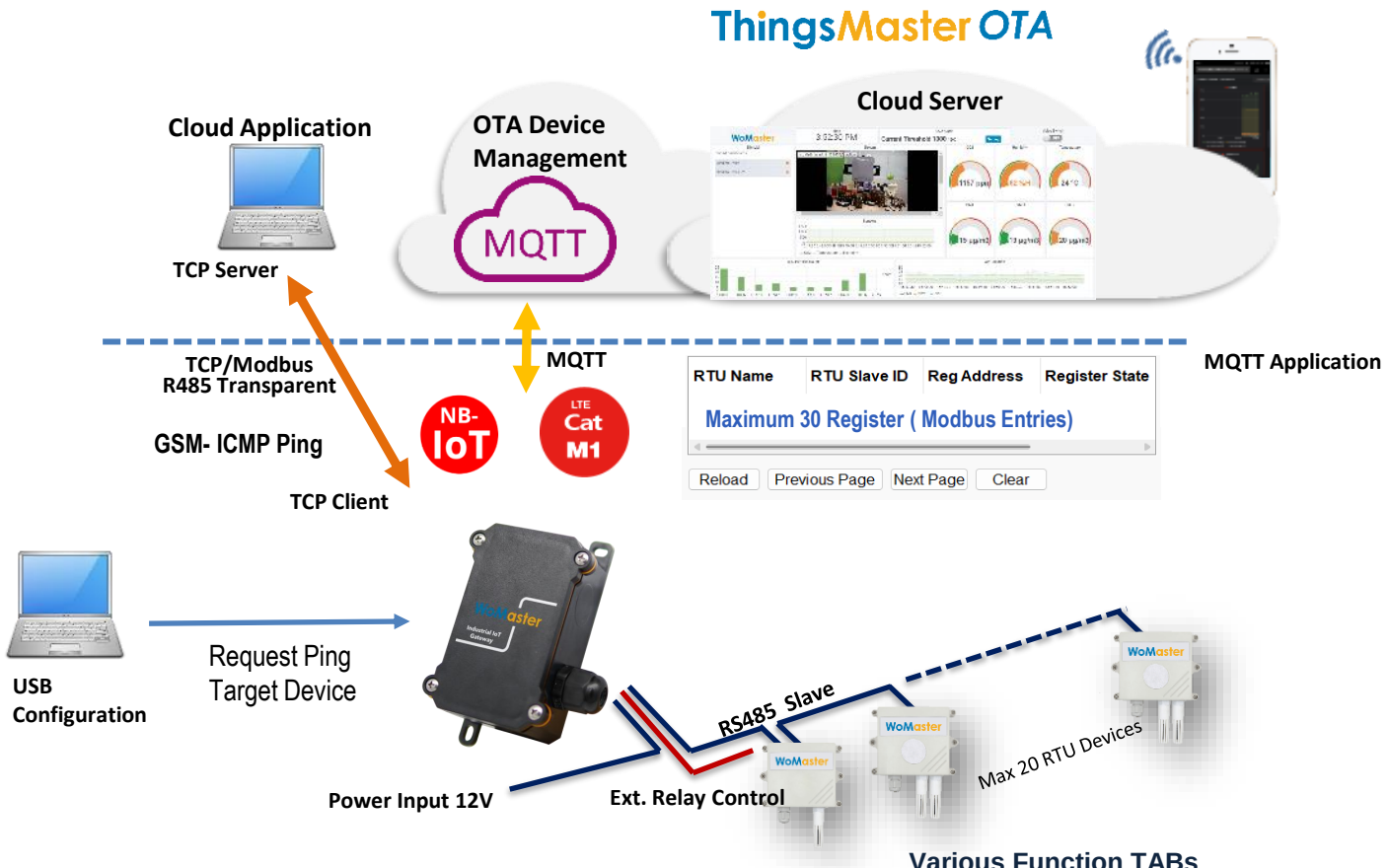
- Spring type, screw-less on-board terminal connector
- 9~30V power input with polarity reverse protection

Network and Protocols

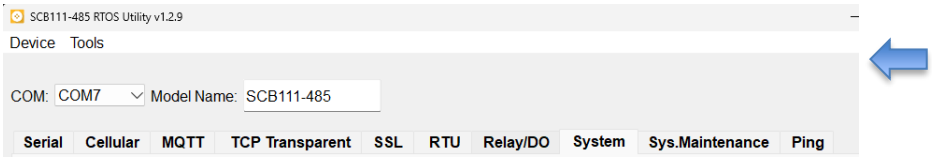
- IPv4 / IPv6 Network
- MQTT Cloud Protocol- Published Modbus RTU Register RAW Data in JSON format, Subscribe Relay Control, Modbus write function code 05,06
- MQTTs, HTTPs with Bas-Station TLS 1.2
- MQTT publish with UNIX / Local Time
- Firmware upgrade Over The Air (FOTA) - Http/Https
- Configuration Upgrade over the Air (COTA) – Https/Https
- TCP Client with Serial Data Transparent

Application

✓ Ready Total Solution for IoT

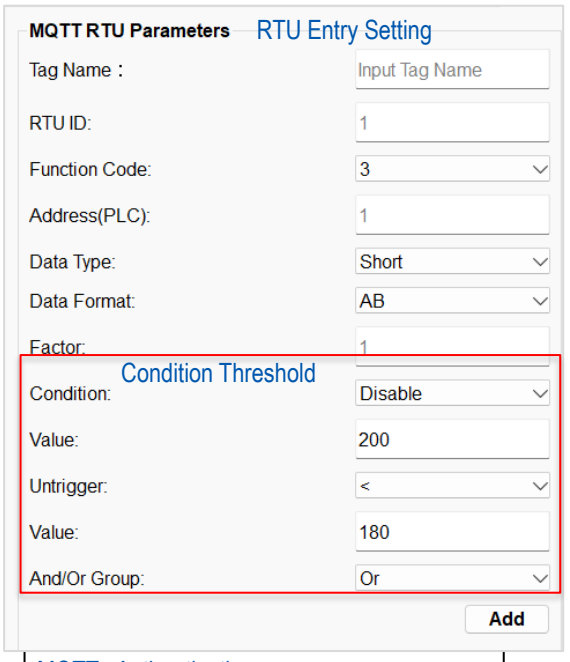


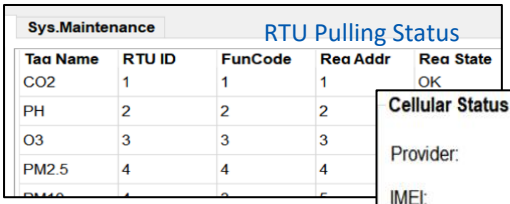
✓ Friendly User Configuration Utility

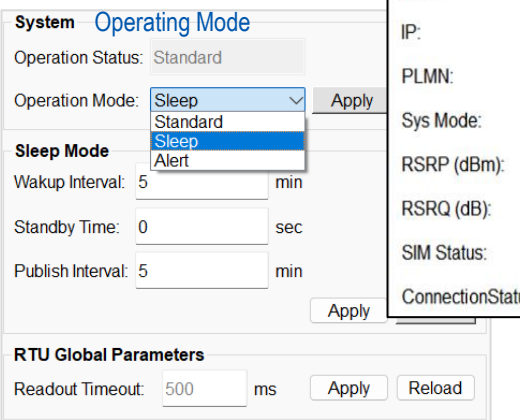


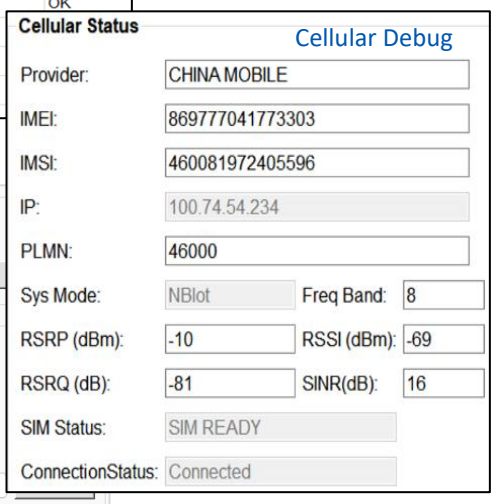
Various Function TABs

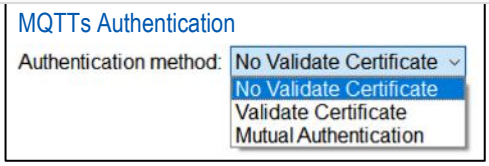
- Modbus RTU Serial, Cellular
- MQTT, TCP Transparent
- Security-SSL
- RTU Device / Register/ Alert Setting
- System operating mode
- System Maintenance – System Log Configuration Upload/Download







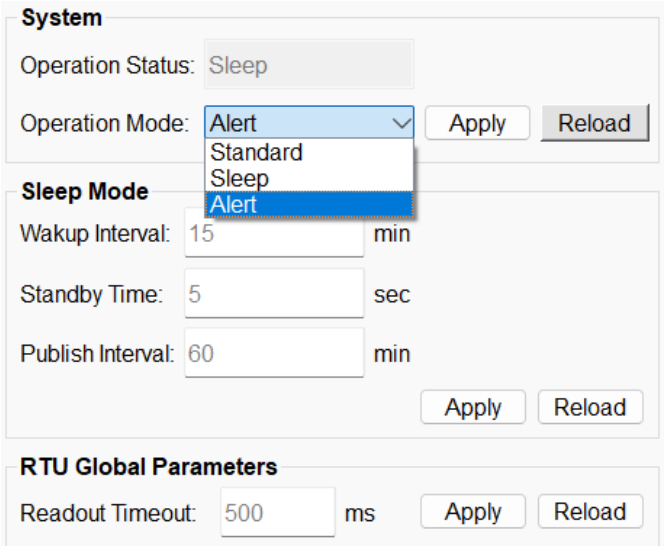




Note: Cellular Parameter Length – APN 51Bytes, IoT (Cloud Server) 51Bytes, Publish/Subscribe Topic : 51 Bytes, User Name/Password: 51Bytes

Application

✓ Multiple Operating Mode- Standard, Alert, Sleep

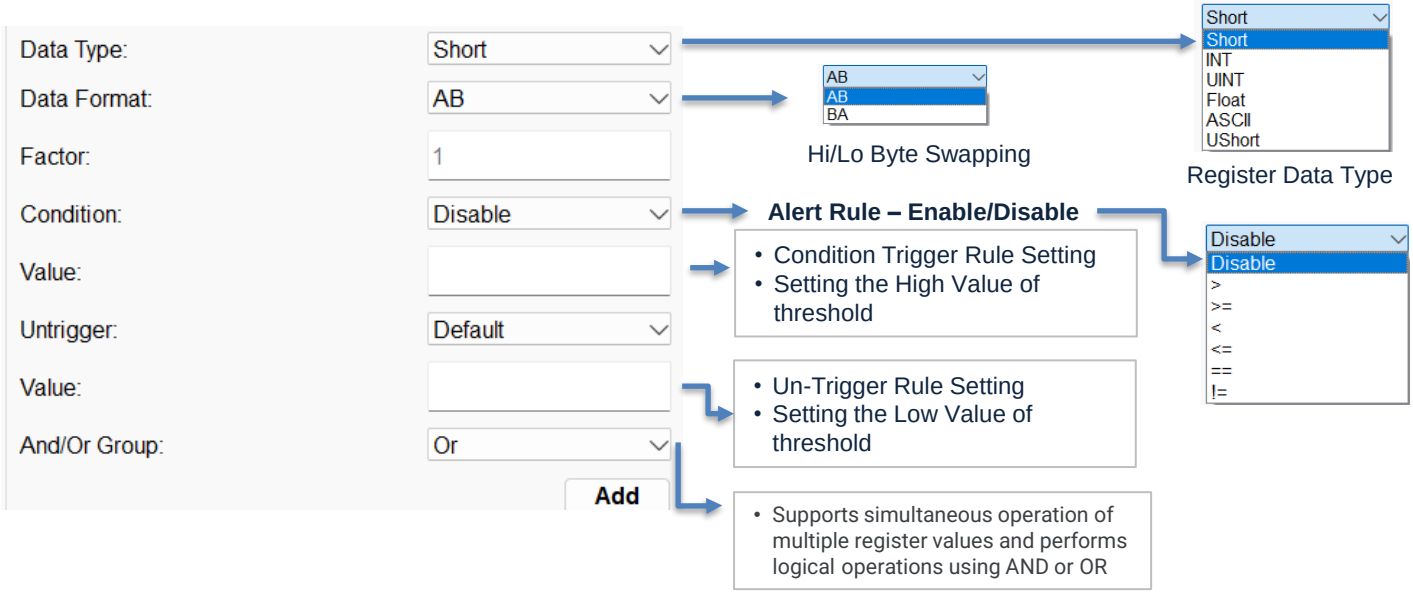


Standard Mode
- Keep Connection always
- System publish interval time follows MQTT setting

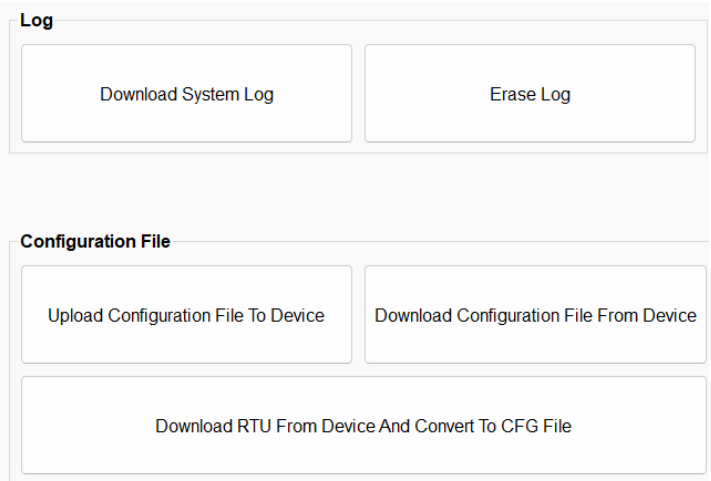
Sleeping Mode
- System wake-up and Trigger-On Relay to enable external circuit.
- RTU register polling will keep a standby timer for RTU ready.
- System publish register value in a publish interval time.

Alert Mode
- System working in sleeping
- mode, wake up polling RTU data.
- Check the RTU value exceeds the threshold value. Once the register value exceeds the condition value, then the system changes to standard mode and performs MQTT publish without sleeping

✓ Converts RAW data and Publish, Judgement



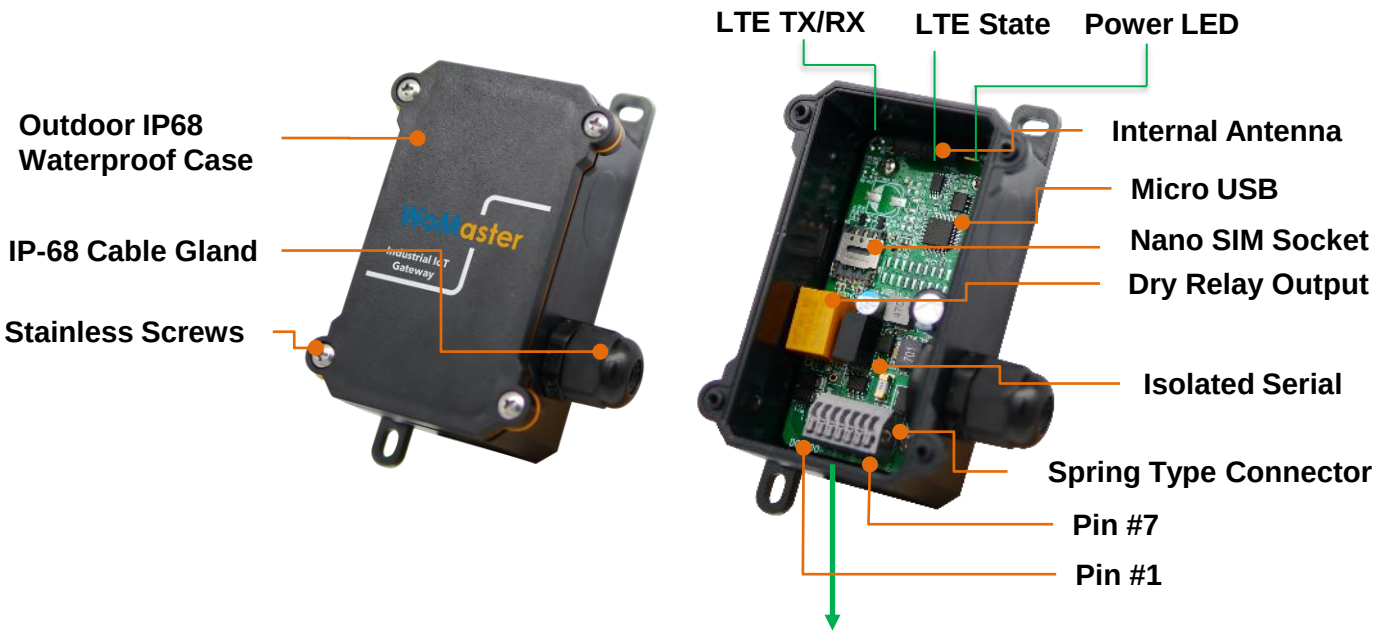
✓ System Event log, Configuration File backup & Restore



- Provides System event log down load and erase
- System Configure file download and upload in CSV

✓ System Event log, Configuration File backup & Restore

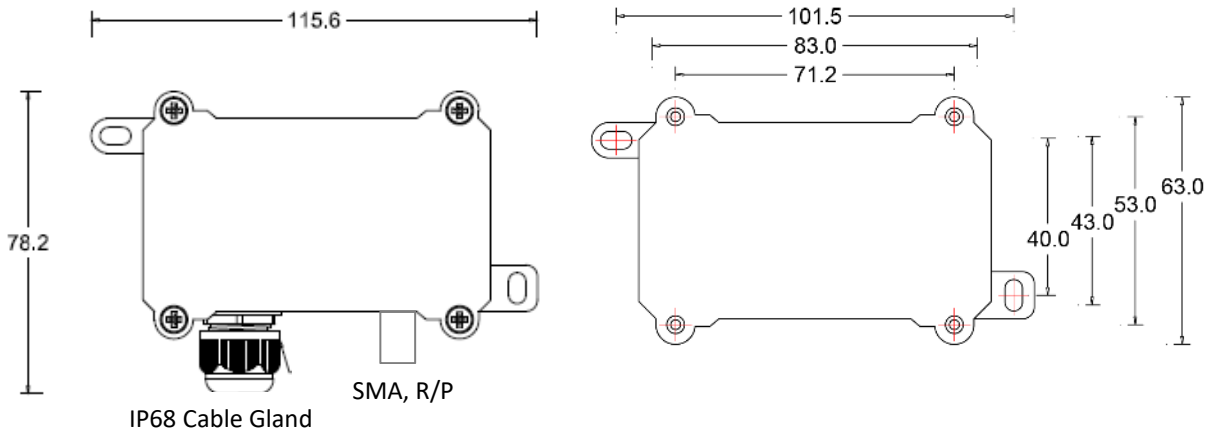
Interfaces

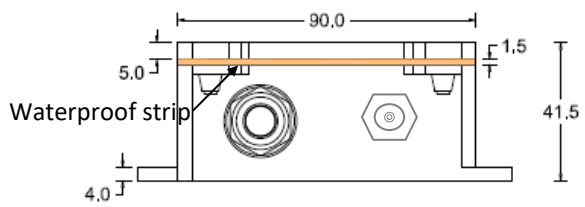


Connector	Pin #1	Pin #2	Pin #3	Pin #4	Pin #5	Pin #6	Pin #7
Function	DO +	DO -	RS485 A	RS485 B	V+	E.G.	V-

Dimensions

(mm)





Specifications

Technology	
Standard	3GPP Release14 Modbus RTU, TCP, MQTT/ MQTTs, HTTP/ HTTPs
Cellular Properties	
Data Throughput	Cat. M1: 529Kbps (DL)/1119Kbps(UL) Cat. NB2: 136Kbps(DL)/ 150Kbps(UL)
Band Information	**Global version** Cat.M1 (LTE-FDD):B1/2/3/4/5/8/12/13/14/18/19/20/26/27/28/66/**---**/ 85 Cat.NB2 (LTE-FDD):B1/2/3/4/5/8/12/13/**---** /18/19/20/26/**---**/28/66/71/85 GSM850/ EGSM900/ DCS1800/ PCS1900 Category=Cat.
Radio RX Sensitivity	Cat. M1 : -103 dBm (Min.) Cat.NB2: -113 dBm (Min.)
Radio TX Power	Cat.M1/ NB2: 20 (+/- 2.7) dBm GSM/EGSM:33 (+/- 2) dBm DCS/PCS: 30 (+/- 2) dBm
LTE Indication (Utility)	Connected Band, Operating Mode: M1/NB RSRQ: Signal Receive Quality measured, Unit dB RSRP: Signal Received Power for Cat-M1, NB1/NB2, Unit dBm RSSI: Received Signal Strength Indicator, Unit dBm SINR: Signal to Interference plus Noise Ratio, -20~30 dB
Management	
System Management	1 x Micro USB 2.0 internal port for System Utility Configuration Event Log: 100 Entries, supports download file, Erase Data Log Configuration Upload / Download
Network	IPv4/ IPv6
Software Utility	SCB111-485 utility, executed at Windows system without Pre-installation
Event Log	100 Event Entries, Power On, Base_Station_Fail, MQTT_Server_Fail
Ping Alive Check	Support Ping function for the Far-End device alive check in GSM mode.
Configuration Backup	Configuration Download/Upload via Utility in Text file. Parameter Includes: RTU Port, IoT Parameters, MQTT Parameters, RTU Tag/ Register
Operation Mode	
Operating Mode	3 Operating Modes – Standard, Sleep, Alert • Standard Mode: LTE Communication keep alive • Sleeping Mode: provides energy saving feature and supports Wake up Interval timer, Standby Timer to enable RTU polling and Publish Interval Timer. • Alert Mode: working in sleep /power saving mode, and once the register value is over the threshold value then change to Standard mode with more frequent publish.
Condition /Alert	Provides Hi/Low Threshold with simultaneous operation of multiple register values and performs logical operations using AND or OR.
Interface (Internal)	
SIM Socket	1x Nano-SIM Socket
USB	1x Micro USB for configuration & firmware upgrade, operating mode adjust by internal jumper
Antenna	SCB111-485: 1x 3dBi internal Antenna SCB111-485-SMA: Waterproof SMA Connector

Note: The “Windows” copyright belongs to Microsoft Inc.

Relay Output	On-Board Screw-less, Spring Type Terminal Connector (20~24AWG) – 2 Conductors Internal Dry Relay Output (DO), Rating: 30VDC/1A
RS485	On-Board Screw-less, Spring Type Terminal Connector (20~24AWG) – 2 Conductors 2-Wire RS485A, RS485B with isolation Baud Rate:1200, 2400,4800, 9600bps DMA Polling Time: 120 Seconds /Cycle (Maximum) with 140 Registers Routing Polling (Modbus RTU time-out 200ms)
Power Input	On-Board Screw-less, Spring Type Terminal Connector (20~24AWG) – 2 Conductors Earth Ground (E.G.) - 1 Conductor Power Input: DC24V (Rating 9~30V) Power Consumption: 3W / DC 24V (Maximum), 260uA@ Power Saving mode
Communication	
MQTT Modbus	Connects RTU device handle up to 20 and handle 30 registers with a process capability of 60 bytes. **Modbus Register Data Format:** Short/ Unsigned Short/ Integer /Unsigned Integer /Float / ASCII for Modbus function code 03, 04 and Byte-Swap function - Big-Endian, Little-Endian **MQTT Publish:** Relay State Modbus Function Code 01: Read Coil-Read Output Control bit Modbus Function Code 02: Read Discreet-Read Input bit, Read Input bit Modbus Function Code 03: Read Holding Register – Read Output word Modbus Function Code 04: Read Input Registers – Read Input Word **MQTT Subscribe:** after system published, the system change to subscribe mode until next publish. After subscribe control, the system will publish ECHO message to MQTT server. The available functions as following: • Relay Control On/Off • Modbus Function Code 05: Write Single Coils – Write one bit output • Modbus Function Code 06: Write single Register – Write one word output
RS485/ TCP Transparent	Bi-Directional data transparent between TCP Server and Modbus RTU Device During the TCP Transparent Mode, the LTE keep connection without suspend
FOTA (Firmware OTA) **COTA (Configure OTA)**	The firmware upgrade over the air (FOTA) function is only available at MQTT operating mode by the HTTP get command. The device subscribes the FOTA command from the MQTT Cloud server. The Modbus RTU configuration supports upgrade through the HTTP get command (COTA) Supports 2 Flash-ROM segments to ensure the system doesn't crash by power interruption during the FOTA.
SSL	MQTTs/HTTPs/TCP supports Validate Certificate, Mutual Authentication
LED Indication	LTE TX/RX (G) : second blinking (no register), blinking slow (registered), fast flashing (LTE communication) LTE State (G): On (LTE module ready), Off (LTE module off) (For power saving will be removed) Power: On (Power ready) (For Power Saving will be removed)
External Interface	
Cable Gland	4-8mm cable diameter, IP68 Protection
SMA Antenna	SCB111-485-SMA: 1 water-proof SMA type connector SCB111-485-DC: Internal Spring type, 3dBi

Mechanical & Installation	
Installation	Wall Mounting with 2 Mounting holes
Dimension	115.6 x 78.2 x 41.5 mm 90 x 50 x 42 mm (without mounting ear, Cable Gland)
Ingress Protection	IP 68 Plastic Housing Note-1
Weight	100g
Environmental	
Operating Temperature	-40°C~70°C, 0% ~ 90%, Non-Condensing
Storage Temperature	-40°C~80°C, 0% ~ 90%, Non-Condensing
Reliability & Warranty	
MTBF	> 200,000 Hours
Warranty	3 Years

Ordering Information

Model	Description
SCB111-485-DC	Industrial Smart Modbus RS485 Gateway, NBIoT, LTE Cat. M1, 1 Nano-SIM, Global Band, DO ,9~30Vdc, Internal Spring type Antenna
SCB111-485-SMA	Industrial Smart Modbus RS485 Gateway, NBIoT, LTE Cat. M1, 1 Nano-SIM, Global Band, DO ,9~30Vdc, SMA Connector