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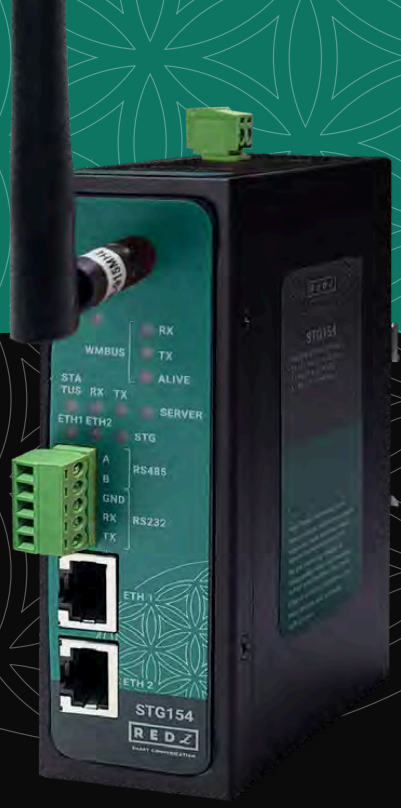
SMART COMMUNICATION

redz-sc.com hi@redz-sc.com



STG Series WMBus Gateway

WMBus to Modbus TCP or Modbus RTU gateway with MQTT publisher
WMBus to TCP/IP or serial transparent gateway
WMBus decoder with MQTT publisher and WMBus repeater

2 x 10/100Base-T(X) Ethernet ports, 1 x RS232 and 1 x RS485, and a model with Broadband Power Line (BPL) link

STG Series WMBus Gateways receive Wireless M-Bus (WMBus) telegrams of meters over the air, decrypt and parse them, and make the meter values available as Modbus registers and as MQTT messages.

Six Device Functions

1. **WMBus - Modbus TCP Gateway (and MQTT Publisher):** meter values are read as Modbus TCP registers.
2. **WMBus - Modbus RTU Gateway (and MQTT Publisher):** meter values are read as Modbus RTU registers.
3. **WMBus Decoder/Parser and MQTT Publisher:** meter values are published to an MQTT broker.
4. **WMBus - TCP/IP Transparent Gateway:** received telegrams are passed to TCP/IP clients; clients can send telegrams to the air.
5. **WMBus - Serial Transparent Gateway:** the same over the serial port.
6. **WMBus Repeater:** received telegrams are sent to the air again.

Key Figures

128 (STG154 Lite: 20)
Meters with decryption and Modbus mapping

Up to 3 km
Radio range, line of sight

S, T and C + T modes
Wireless M-Bus reception, 868 MHz

AES-128, security modes 5, 7 and 128
Decryption of encrypted telegrams

~40 / s, 32 ms average
Measured ~24 h at full load, MQTT on (162,787 messages): Modbus RTU, one master - requests answered per second; 0 timeouts in 3.4 M

~448 / s, 22 ms average
Measured ~24 h at full load, MQTT on (160,959 messages): Modbus TCP, 10 clients - requests answered per second; 39 timeouts in 38.4 M

Main Features

Wireless M-Bus

- 868 MHz Wireless M-Bus radio; reception in S mode, T mode, or C and T mode together.
- Decryption of AES-128 encrypted telegrams in security modes 5, 7 and 128.
- Auto configuration from the telegrams heard on the air.
- White list and black list filters for WMBus telegrams.
- Radio output power -1 dBm to 13 dBm, used when the gateway sends telegrams (transparent gateway and repeater functions).
- Link budget up to 130 dB; communication distance up to 3 km in line of sight, typically about 100 m indoor and urban.

Modbus TCP and Modbus RTU

- Every meter is a separate Modbus slave; its registers are read with function 03 (Read Holding Registers), starting at address 0.
- The longest map of a meter is 80 registers; a read past the end of the map is answered, the registers past the end are 0.
- Data type codes 1 - 65.
- Several Modbus TCP masters at the same time: up to 10 TCP clients.

MQTT

- MQTT publisher with three data formats: raw decrypted telegram, parsed data as objects, parsed data as Modbus frame.
- In the Modbus TCP and Modbus RTU gateway functions publishing runs next to the Modbus service.

Network and management

- Embedded web interface; received telegrams, parsed meter data and the device status are shown on it.
- DHCP server.
- Time from an NTP server (UTC), compared once an hour.
- Firmware update from the web interface; two firmware images are stored in the device, one of them active.
- Log output to the console port or to a UDP server.

Extra Features of the STG655 (BPL)

- Up to 30 Mbps PHY rate, up to 10 hops and 1000 nodes.
- OFDM-432 modulation, CSMA/CA, 2 to 28 MHz, LDPC-C FEC with 128-bit AES.
- Data connection: phase to phase (PP), phase to neutral (PN) or a DC power line; the AC version is made with PP or PN, the DC version with PP.
- BPL role (master or node) is selected on the web interface.

STG154 Lite Differences

- 1 x 10/100 Ethernet port
- 1 x RS485 port, no RS232
- 9 - 36 V DC power input (40 V maximum)
- No console port; the log is available over UDP
- AES-128 decryption and Modbus mapping for up to 20 meters

Conformity

- All models (STG154, STG254, STG655, STG154 Lite): compliance with the Radio Equipment Directive 2014/53/EU verified by SGS.
- Radio: EN 300 220-1, EN 300 220-2.
- EMC: EN 301 489-1, EN 301 489-3, EN 55032, EN 55035, EN IEC 61000-3-2, EN 61000-3-3.
- RF exposure: EN 62479. Safety: EN IEC 62368-1.
- Protection against electric shock: Class II (STG254, STG655).

Technical Data

	STG154	STG254	STG655	STG154 Lite
Ethernet	2 x 10/100Base-T(X)	2 x 10/100Base-T(X)	2 x 10/100Base-T(X) + BPL link	1 x 10/100Base-T(X)
Serial	RS232 + RS485	RS232 + RS485	RS232 + RS485	RS485
Console port	USB Type-C (micro USB on earlier hardware), 115200 baud, FTDI	USB Type-C (micro USB on earlier hardware), 115200 baud, FTDI	USB Type-C (micro USB on earlier hardware), 115200 baud, FTDI	None (log over UDP)
Antenna	SMA female, 50 ohm	SMA female, 50 ohm	SMA female, 50 ohm	SMA female, 50 ohm
Power input	5 - 48 V DC (60 V maximum)	100 - 240 V AC, 50 - 60 Hz (120 - 370 V DC)	Three-phase AC, 110 - 240 V, 50 - 60 Hz, or 9 - 36 V DC	9 - 36 V DC (40 V maximum)
Protection	Reverse polarity; thermal shutdown and current limit	Isolation > 4200 Vrms, 5 mA, 1 min; insulation class II	AC: short circuit, overload and over voltage; isolation class II; 3 kV AC input to output	Reverse polarity; insulation 1500 V DC for 1 minute, leakage < 1 mA
Enclosure	Metal, IP 40	Metal, IP 40	Metal, IP 40	Metal, IP 40
Mounting	DIN rail	DIN rail	DIN rail	DIN rail
Dimensions (w x d x h)	43 x 95 x 124 mm	43 x 95 x 124 mm	43 x 95 x 124 mm	43 x 95 x 124 mm
Weight	approx. 380 g	approx. 400 g	approx. 400 g	approx. 400 g
Operating temperature	-40 to 85 C	-25 to 70 C	-25 to 70 C (AC), -40 to 85 C (DC)	-40 to 85 C
Storage temperature	-65 to 150 C	-40 to 85 C	-65 to 150 C	-55 to 125 C
Operating humidity	5% to 95%, non-condensing	10% to 95%, non-condensing	5% to 95%, non-condensing	5% to 95%, non-condensing

Product Comparison

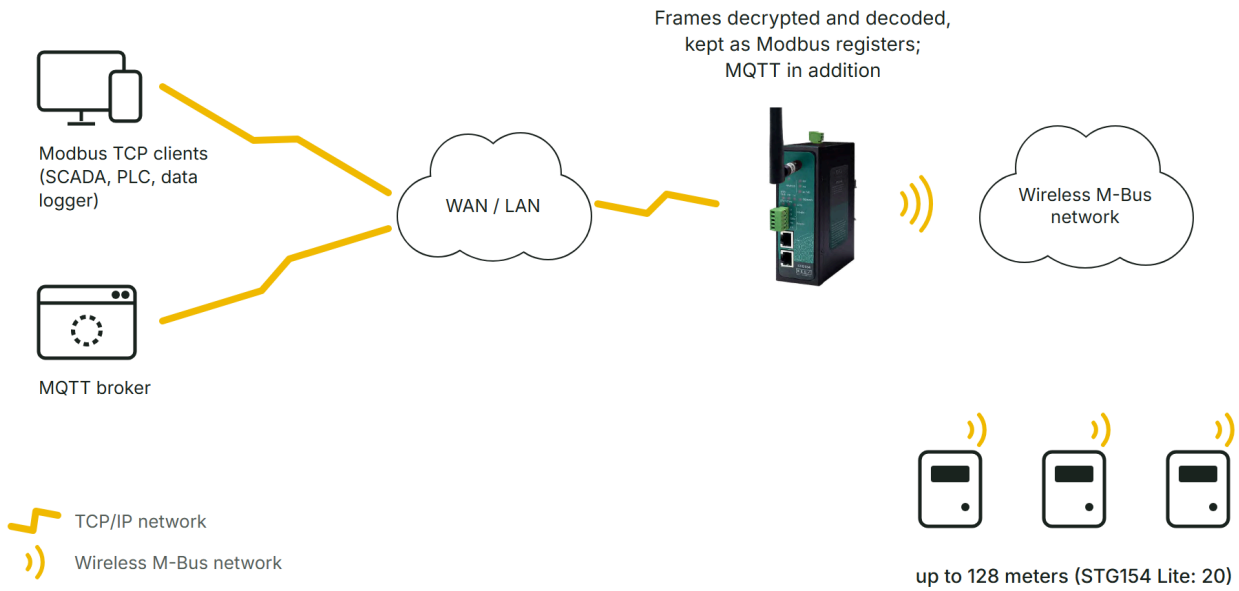
	STG154	STG254	STG655	STG154 Lite
Up to 128 meters	●	●	●	
Up to 20 meters				●
Six device functions, MQTT publisher	●	●	●	●
Decryption: security modes 5, 7 and 128	●	●	●	●
2 x 10/100Base-T(X) Ethernet	●	●	●	
1 x 10/100Base-T(X) Ethernet				●
1 x RS232	●	●	●	
1 x RS485	●	●	●	●
BPL (Broadband Power Line) link			●	
5 - 48 V DC (60 V maximum)	●			
100 - 240 V AC (120 - 370 V DC)		●		
Three-phase AC, 110 - 240 V			●*	
9 - 36 V DC			●*	●

* STG655-PN-AC and STG655-PP-AC with three-phase AC power input, STG655-PP-DC with 9 - 36 V DC power input.

Typical Application

STG configuration

- Device Function: WMBus - Modbus TCP Gateway (and MQTT Publisher)



Typical application - WMBus - Modbus TCP Gateway (and MQTT Publisher)

Ordering Information

STG154: 868 MHz WMBus to Modbus TCP / RTU gateway with MQTT publisher, 2 x 10/100Base-T(X) Ethernet ports, 1 x RS232 and 1 x RS485, 5 - 48 V DC power input (60 V maximum)

STG254: 868 MHz WMBus to Modbus TCP / RTU gateway with MQTT publisher, 2 x 10/100Base-T(X) Ethernet ports, 1 x RS232 and 1 x RS485, 100 - 240 V AC, 50 Hz to 60 Hz (120 - 370 V DC) power input

STG655-PN-AC: 868 MHz WMBus to Modbus TCP / RTU gateway with MQTT publisher, 2 x 10/100Base-T(X) Ethernet ports and 1 x BPL link, 1 x RS232 and 1 x RS485, three-phase AC power input, 110 - 240 V, 50 - 60 Hz, phase to neutral (PN) data connection

STG655-PP-AC: 868 MHz WMBus to Modbus TCP / RTU gateway with MQTT publisher, 2 x 10/100Base-T(X) Ethernet ports and 1 x BPL link, 1 x RS232 and 1 x RS485, three-phase AC power input, 110 - 240 V, 50 - 60 Hz, phase to phase (PP) data connection

STG655-PP-DC: 868 MHz WMBus to Modbus TCP / RTU gateway with MQTT publisher, 2 x 10/100Base-T(X) Ethernet ports and 1 x BPL link, 1 x RS232 and 1 x RS485, 9 - 36 V DC power input, phase to phase (PP) data connection

STG154 Lite: 868 MHz WMBus to Modbus TCP / RTU gateway with MQTT publisher, 1 x 10/100Base-T(X) Ethernet port, 1 x RS485, 9 - 36 V DC power input (40 V maximum)