Varibits

Serial Broker 1000 - RS485 to Ethernet gateway

Summary

SB1000 offer seamless conversion between Modbus RTU and Modbus TCP, BACnet and MQTT.

The device can be used as:

- Modbus TCP to RTU gateway
- Modbus RTU to TCP, BACnet and MQTT gateway
- Modbus RTU to RTU
    - Signal splitter: Slaves can be shared between a modbus RTU master and a modbus TCP master
    - Signal isolator/repeater
    - Baud-rate converter
- Virtual com port via TCP/IP

Default IP 192.168.1.232

When using default password (no password), there is no need to log in.

Features

- 2x RS485-ports
- RJ45 Ethernet 10/100Mbit port
- Wireless 2.4GHz WiFi, can run as either Access Point or client.
- 1 digital input.
- AC/DC input. Polarity independent.
- Onboard temperature sensor.
- BIAS termination and end termination resistors, controlled via software.

Installation

- Mount on DIN rail.
- Connect power to 9-24V AC/DC input. The input is polarity independent.
- Connect RS485-bus.
- Connect the device to a network via the ethernet port, or via WiFi.

Reset to factory defaults

Disconnect power
Hold the button “FACT RESET” down. The button is located beneath the top cover.
Either remove the cover and press the button or insert something into the hole (directly) and make sure to hit the button beneath.
Power the device and hold the button pressed for 10 seconds.

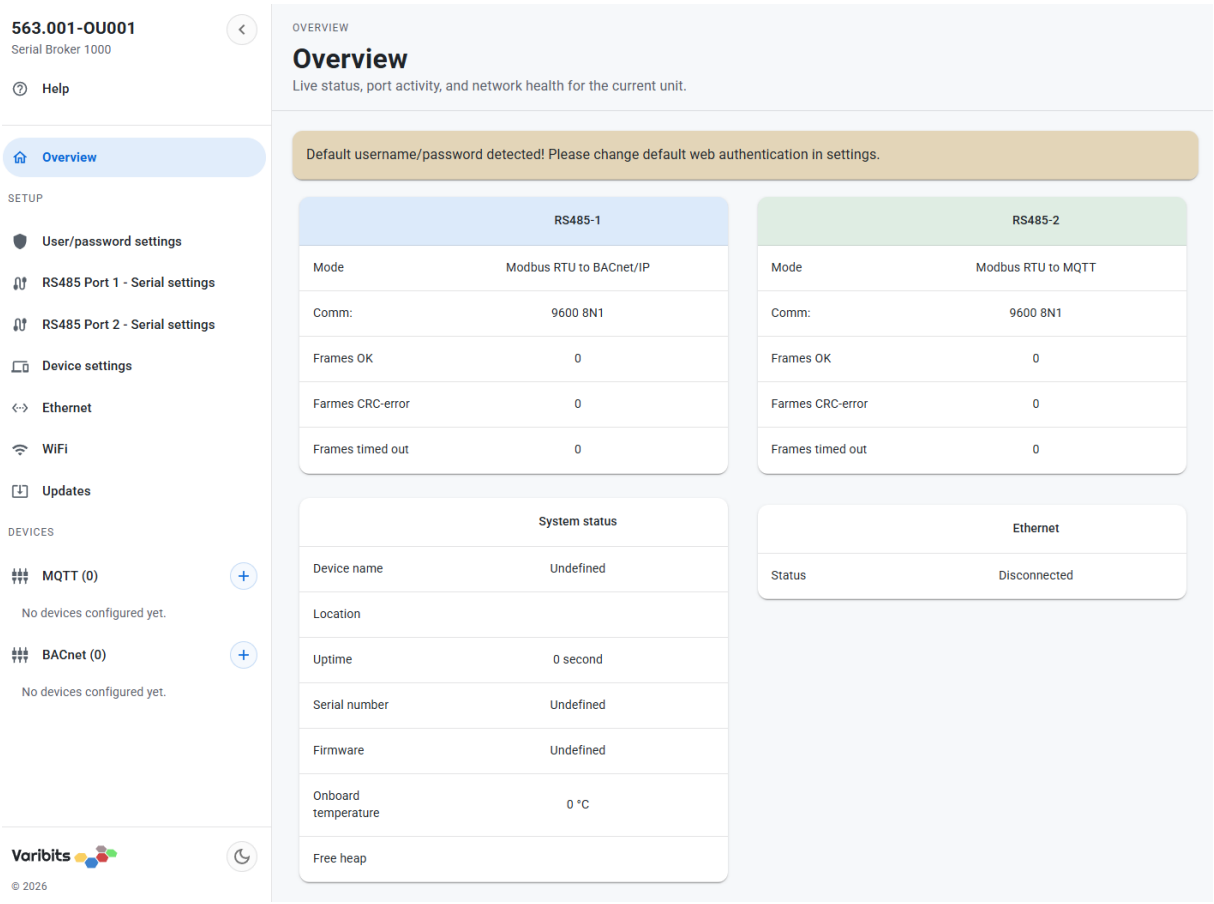
Configuration via web interface

The device is configured via the web interface.
The device can be reached at http://192.168.1.232
If no password is set, there will be no need to login.

We strongly advise you to change your password after logging in.

You will find your navigation tree on the left hand side.

- On “Overview”, one can view the current configuration and statistics.
- Setup: Change settings.
- Firmware-update:
    - Upload BIN file
    - Or use the internet connection of your computer to upload new firmware. The device itself does not require an internet connection.
- Help: Documentation, troubleshooting, etc.



Excerpt from settings:

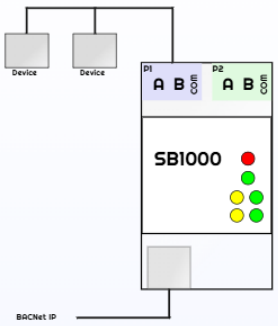
When configuring a BACnet integration, set the RS485-port to BACnet.

SETUP

RS485 Port 1 - Serial settings

Configure mode, framing, and line behavior for the primary RS485 interface.

MODE	DESCRIPTION
Disabled	Turns the serial interface off and hides protocol-specific settings.
Modbus TCP to Modbus RTU	Lets Modbus TCP clients reach RTU devices on the serial bus.
Modbus RTU to Modbus TCP	Polls RTU devices locally and exposes them through a Modbus TCP server.
Modbus RTU to Modbus RTU	Bridges traffic directly between the unit's two serial ports.
Virtual COM-port (RFC2217)	Exposes the port as a remote RFC2217 virtual COM connection. Drivers must be installed on the windows/linux/MAC host.
Modbus RTU to MQTT	Publishes Modbus RTU data to MQTT for upstream integrations.
Modbus RTU to BACnet/IP	Publishes Modbus RTU data to BACnet/IP for building automation.
Raw TCP tunnel	A raw Serial-TCP-Serial tunnel. Can be used to link 2 SB1000, or as a bridge between raw TCP and serial.



Baud-rate:

9600

Parity:

None

Stop-bits:

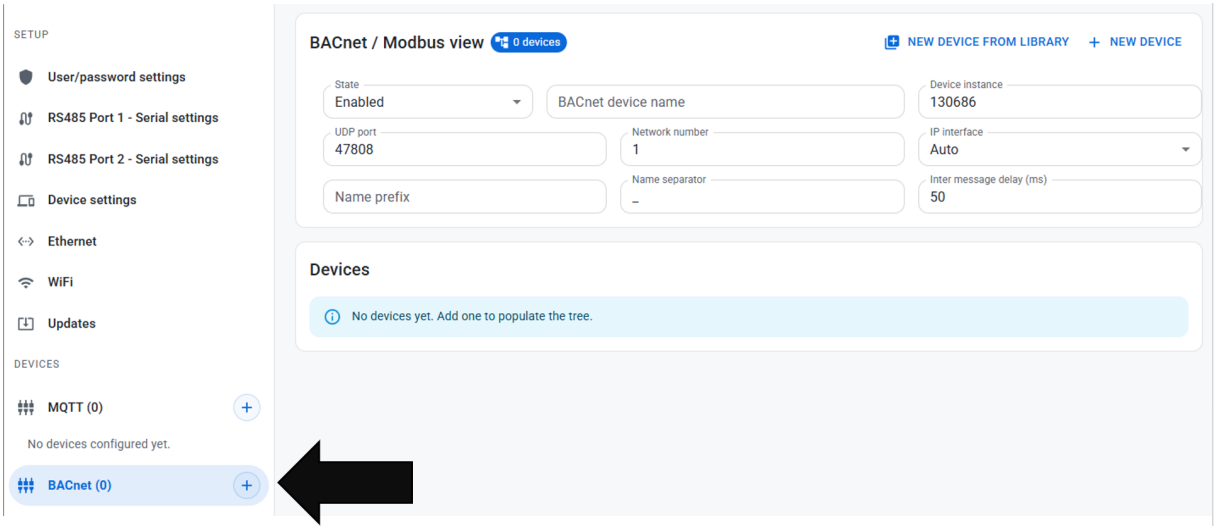
1

Terminating resistors:

Disabled

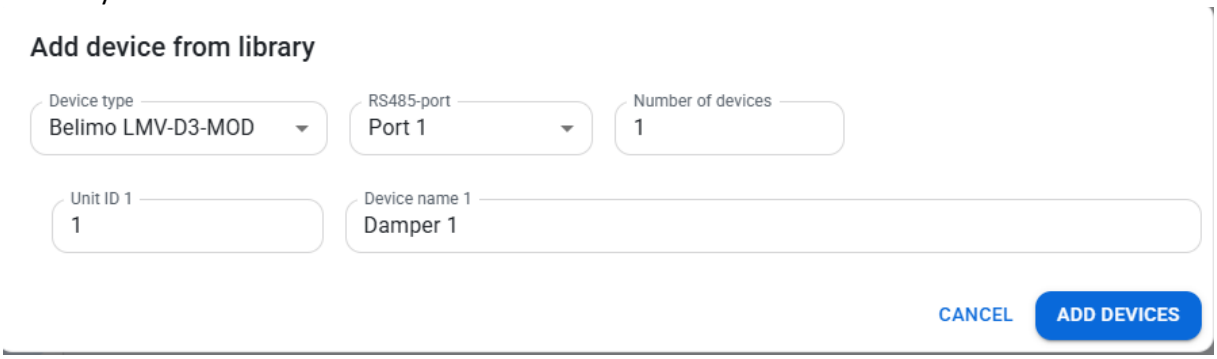
SAVE PORT 1 SETTINGS

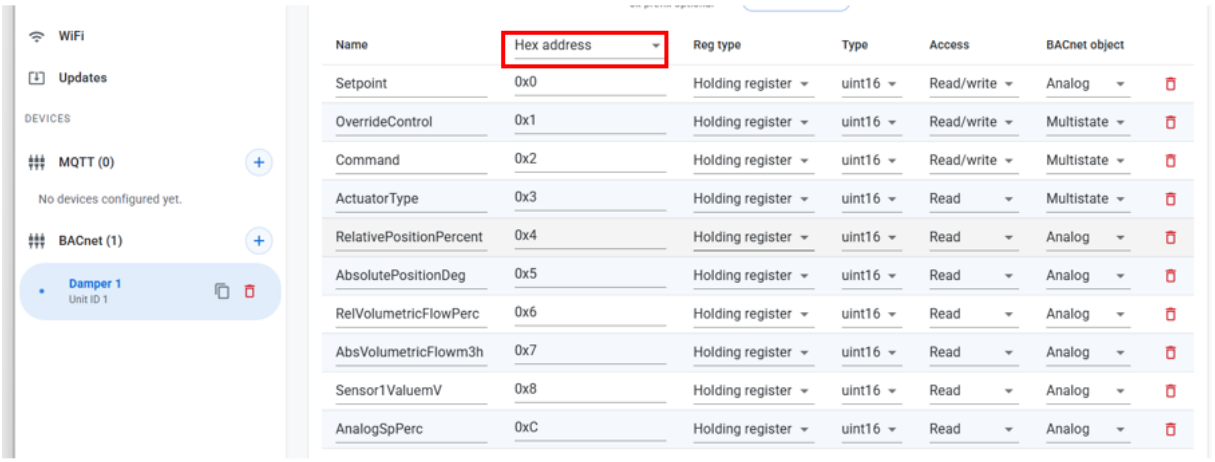
Go to the BACnet properties, set up the thing like instance number and object name:



Add device from library;
There are 2 libraries;

- One built-in in the SB1000 firmware.
- One global online library. To access this, your SB1000 won't need an internet connection, but your browser does.





Press the save button.
Congratulations!
You've integrated a damper from modbus RTU to BACnet IP!

Further settings are self-explanatory or described in the help-section on the device.

We would however like to highlight:

- It is possible to switch between Decimal or Hexadecimal addressing scheme.
- Object names are hardcoded in the following manner:
    - MQTT: Prefix/DeviceName/ObjectName
    - BACnet: Prefix[Separator]DeviceName[Separator]ObjectName.
      The separator by default is underscore, so in the setup above, an object name will typically be Damper1_OverrideControl.
    - BACnet Instance IDs have a max value of 1024.
      So AnalogInput:1024, BinaryInput:1024, etc.
- If the device is unconfigured, it will start as a wireless access point with no password.
  This access point will remain active for 3 minutes, and if clients are connected, it will stay active for 10 minutes.
  You can then access the device at http://192.168.2.232 for quick setup.
  If any settings have been saved to the device, it will not start as an access point, unless configured.
- There is a factory reset-button that can be reached beneath the lid for the RS485-ports.
  Use a screw driver to open the lid.
  Remove power from the device.
  Hold the reset-button and keep it held for 10 seconds after powering the device.
  When LEDs begin activity, the factory reset has been completed.
  All settings and firmware version will be reverted back to factory state.

- The maximum number of converted MQTT points is 1000 points.
- The maximum number of converted BACnet points is 800 points.
- A device/point can't be exposed to both BACnet and MQTT at the same time. The drivers must be bound to a given port, say MQTT on port 1, and BACnet on port 2.
  In this case, the maximum number of MQTT points will depend on the number of BACnet points, as these consume more system resources.

  The total maximum can be calculated in the following manner:

$$(Bacnet\ Points * 1.25) + Mqtt\ Points < 1000$$

Configuration via Modbus Management Interface / MMI

Using MMI, one can read statistics from the device or modify general settings. This operates as a standard Modbus TCP device. Note that it **runs on port 4010**, NOT the usual port for Modbus TCP (502). You can choose to run the MMI on a different port using the web interface.

Name	Address	Details	Access
Device signature	40001-40002	123456789 - Test register, UINT32	R
Digital input state	40003	0 = Low, 1 = High	R
Onboard temperature	40004	°C *10	R
Device uptime	40005-40006	Seconds, UINT32	R
Firmware version	40007	Number	R
Ethernet IP - Octet 1	40100	IPv4 octet 0-255	R/W
Ethernet IP - Octet 2	40101	IPv4 octet 0-255	R/W
Ethernet IP - Octet 3	40102	IPv4 octet 0-255	R/W
Ethernet IP - Octet 4	40103	IPv4 octet 0-255	R/W
Ethernet Subnet Mask - Octet 1	40104	IPv4 octet 0-255	R/W
Ethernet Subnet Mask - Octet 2	40105	IPv4 octet 0-255	R/W
Ethernet Subnet Mask - Octet 3	40106	IPv4 octet 0-255	R/W
Ethernet Subnet Mask - Octet 4	40107	IPv4 octet 0-255	R/W
Ethernet Gateway - Octet 1	40108	IPv4 octet 0-255	R/W
Ethernet Gateway - Octet 2	40109	IPv4 octet 0-255	R/W
Ethernet Gateway - Octet 3	40110	IPv4 octet 0-255	R/W
Ethernet Gateway - Octet 4	40111	IPv4 octet 0-255	R/W
Ethernet DHCP Enable	40112	0 = Disabled, 1 = Enabled	R/W
Apply Ethernet network changes	40113	Write any value	R/W
Wi-Fi IP - Octet 1	40200	IPv4 octet 0-255	R/W
Wi-Fi IP - Octet 2	40201	IPv4 octet 0-255	R/W
Wi-Fi IP - Octet 3	40202	IPv4 octet 0-255	R/W
Wi-Fi IP - Octet 4	40203	IPv4 octet 0-255	R/W
Wi-Fi Subnet Mask - Octet 1	40204	IPv4 octet 0-255	R/W
Wi-Fi Subnet Mask - Octet 2	40205	IPv4 octet 0-255	R/W
Wi-Fi Subnet Mask - Octet 3	40206	IPv4 octet 0-255	R/W
Wi-Fi Subnet Mask - Octet 4	40207	IPv4 octet 0-255	R/W
Wi-Fi Gateway - Octet 1	40208	IPv4 octet 0-255	R/W
Wi-Fi Gateway - Octet 2	40209	IPv4 octet 0-255	R/W
Wi-Fi Gateway - Octet 3	40210	IPv4 octet 0-255	R/W
Wi-Fi Gateway - Octet 4	40211	IPv4 octet 0-255	R/W
Wi-Fi DHCP Enable	40212	0 = Static, 1 = DHCP	R/W
Apply Wi-Fi network changes	40213	Write any value	R/W
DNS1 - Octet 1	40300	IPv4 octet 0-255	R/W
DNS1 - Octet 2	40301	IPv4 octet 0-255	R/W
DNS1 - Octet 3	40302	IPv4 octet 0-255	R/W
DNS1 - Octet 4	40303	IPv4 octet 0-255	R/W
DNS2 - Octet 1	40304	IPv4 octet 0-255	R/W

DNS2 - Octet 2	40305	IPv4 octet 0-255	R/W
DNS2 - Octet 3	40306	IPv4 octet 0-255	R/W
DNS2 - Octet 4	40307	IPv4 octet 0-255	R/W
DNS Source Select	40308	0 = Use DHCP DNS, 1 = Manual DNS	R/W
RS-485 Port 1 Baud Rate	40400	Device defined enumeration	R/W
RS-485 Port 1 Parity	40401	0=None, 1=Even, 2=Odd	R/W
RS-485 Port 1 Stop Bits	40402	Device defined enumeration	R/W
RS-485 Port 1 Data Bits	40403	Device defined enumeration	R/W
RS-485 Port 1 Bias Termination	40404	0=Off, 1=On	R/W
RS-485 Port 1 End Termination	40405	0=Off, 1=On	R/W
RS-485 Port 1 Mode	40406	0…5 (device defined)	R/W
RS-485 Port 2 Baud Rate	40420	Device defined enumeration	R/W
RS-485 Port 2 Parity	40421	0=None, 1=Even	R/W
RS-485 Port 2 Stop Bits	40422	Device defined enumeration	R/W
RS-485 Port 2 Data Bits	40423	Device defined enumeration	R/W
RS-485 Port 2 Bias Termination	40424	0=Off, 1=On	R/W
RS-485 Port 2 End Termination	40425	0=Off, 1=On	R/W
RS-485 Port 2 Mode	40426	0…5 (device defined)	R/W

Register 40001 is a UINT32 register that reads 123456789. The register is here to make sure that you have hit the right data order.

Electrical Characteristics

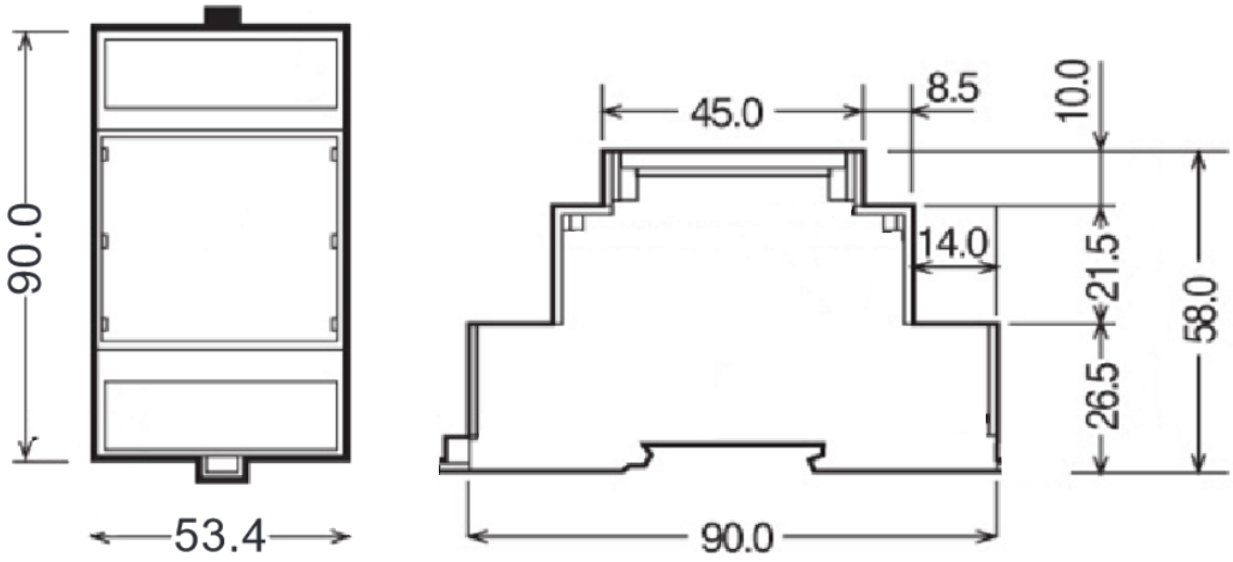
Power consumption:	2 W.
Input voltage:	9-24 V AC/DC

Dimensions / material:

Height	90mm
Width:	53mm
Depth:	58mm
Weight:	100g
Material:	Polycarbonate
PCB:	FR4 TG155
UL-rating:	UL94-V0
IP-class:	IP20

Ambient temperature/humidity:
Temperature 0-70 °C, Relative humidity < 85 %Rh

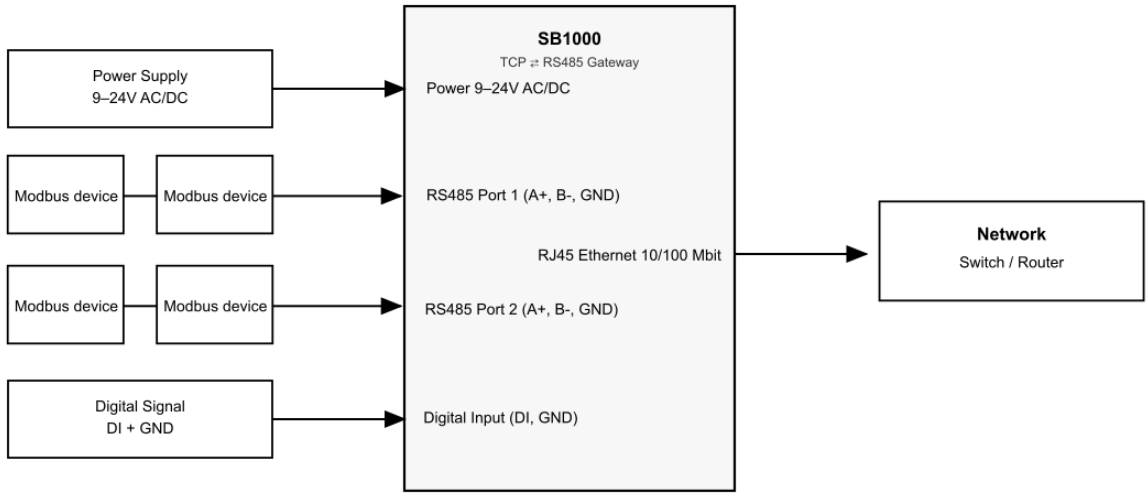
Dimensions in mm.



Width is three standard DIN-modules.

Connection diagram

SB1000 – Connection Diagram (Physical)



Product link: https://varibits.no/sb

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