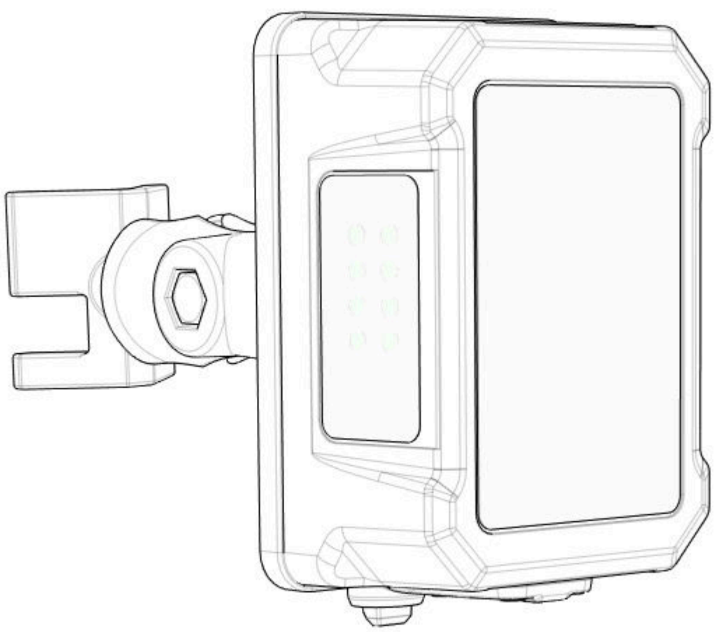
TECHNICAL MANUAL

SB1

10083 Sensor bridge



INTRODUCTION

The ReVibe SB1 (10083) is a Power-over-Ethernet (PoE) sensor bridge designed to use Modbus TCP to transmit measurement data which it receives wirelessly from connected sensors.
SB1 is designed to work with the ANURA VS family of sensors, utilizing the 2.4 GHz spectrum for communication. SB1 enables the Anura system to establish and manage connections with up to eight sensors per unit.

PACKAGE CONTENTS

Name:	Part no:
SB1 sensor bridge	10083
RAM Strap Hose Clamp	40006
RAM Double socket arm	40007
RAM Ball adapter with AMPS Plate	40008

INSTALLATION

1. Requirements

Please ensure that these requirements are fulfilled before starting the installation process:

- [ ] You have access to edit the automation controller's configuration
- [ ] The automation controller has a Modbus TCP client (alternatively you can use a Modbus TCP gateway)
- [ ] There is an Ethernet switch supporting Power-over-Ethernet (PoE) to power the sensor bridge on-site

You have:

- [ ] A computer with which to configure the sensor bridge and the automation controller
- [ ] Tools for physically mounting components in desired locations
- [ ] A few regular Ethernet cables

2. Sensor preparations

If the sensors haven't already been installed, do so according to the instructions that came with the sensors.

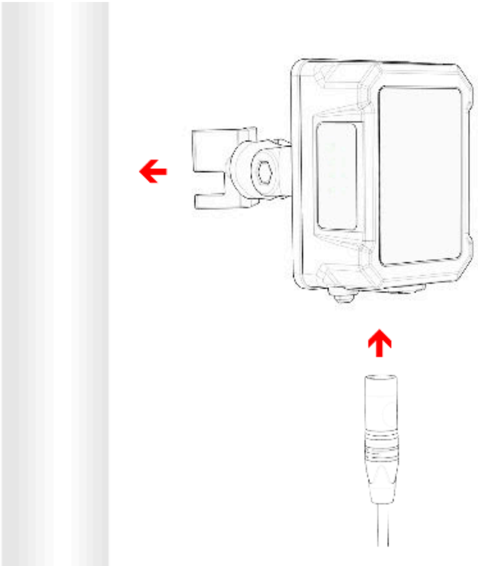
Write down the BLE address for each sensor. You find the BLE address written on the sensor's case under *ID:* in the format of *AA:BB:CC:DD:EE:FF*.

It may be useful to keep track of which sensor BLE address corresponds to which physical sensor (e.g. by having a name or number for each), in case you later wish to use the values from different sensors in different ways.

3. Physical installation

Mount the sensor bridge in its desired operation location.

Connect the sensor bridge to a PoE port on the Ethernet switch using the provided RJ45 to Neutrik etherCON cable. Eight orange LEDs on the transceiver indicate power and readiness on startup.



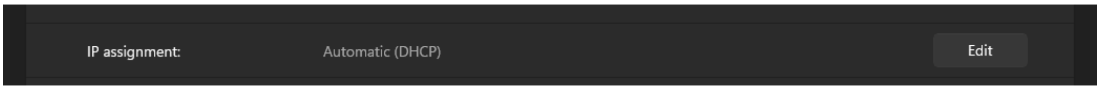
SB1 with RAM mount installed, fixate the RAM mount to a structure (e.g. pole or railing). Connect the Neutrik etherCON to the connector situated in the bottom of the sensor bridge. An audible click indicates that the connector is secure.

Connect the automation controller's Modbus TCP interface to the Ethernet switch using an Ethernet cable.

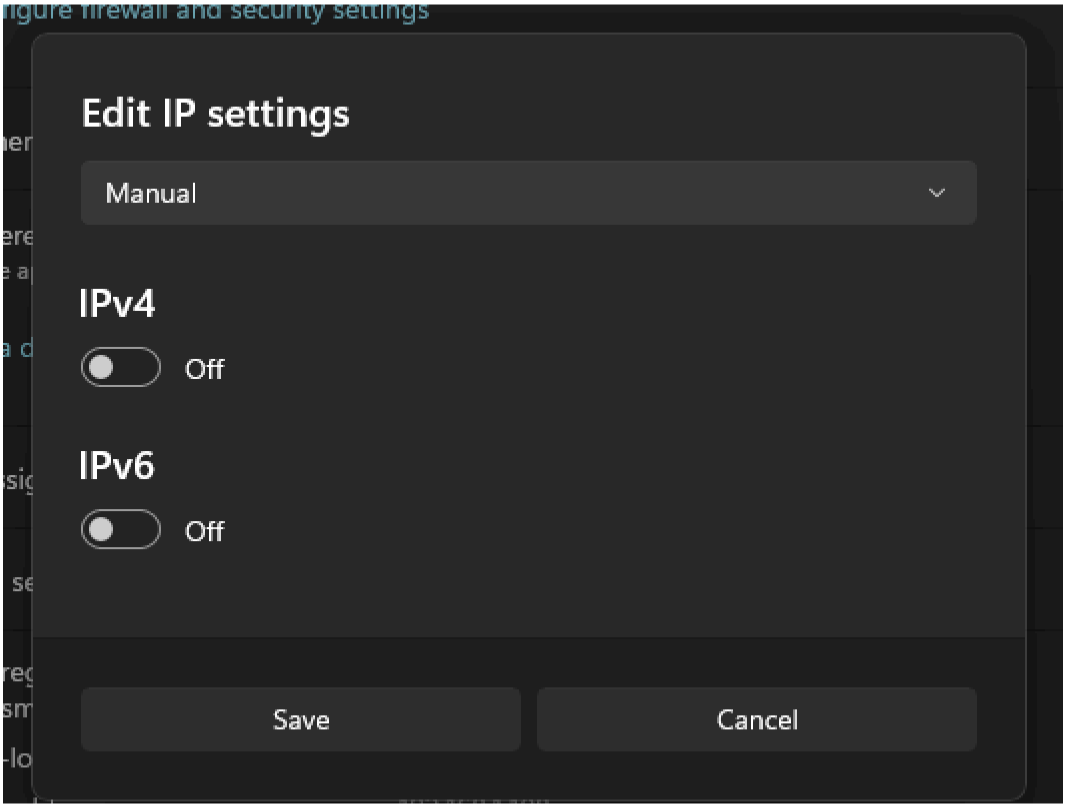
4. Setting your computer’s IP address

Connect your computer to the Ethernet switch using an Ethernet cable.

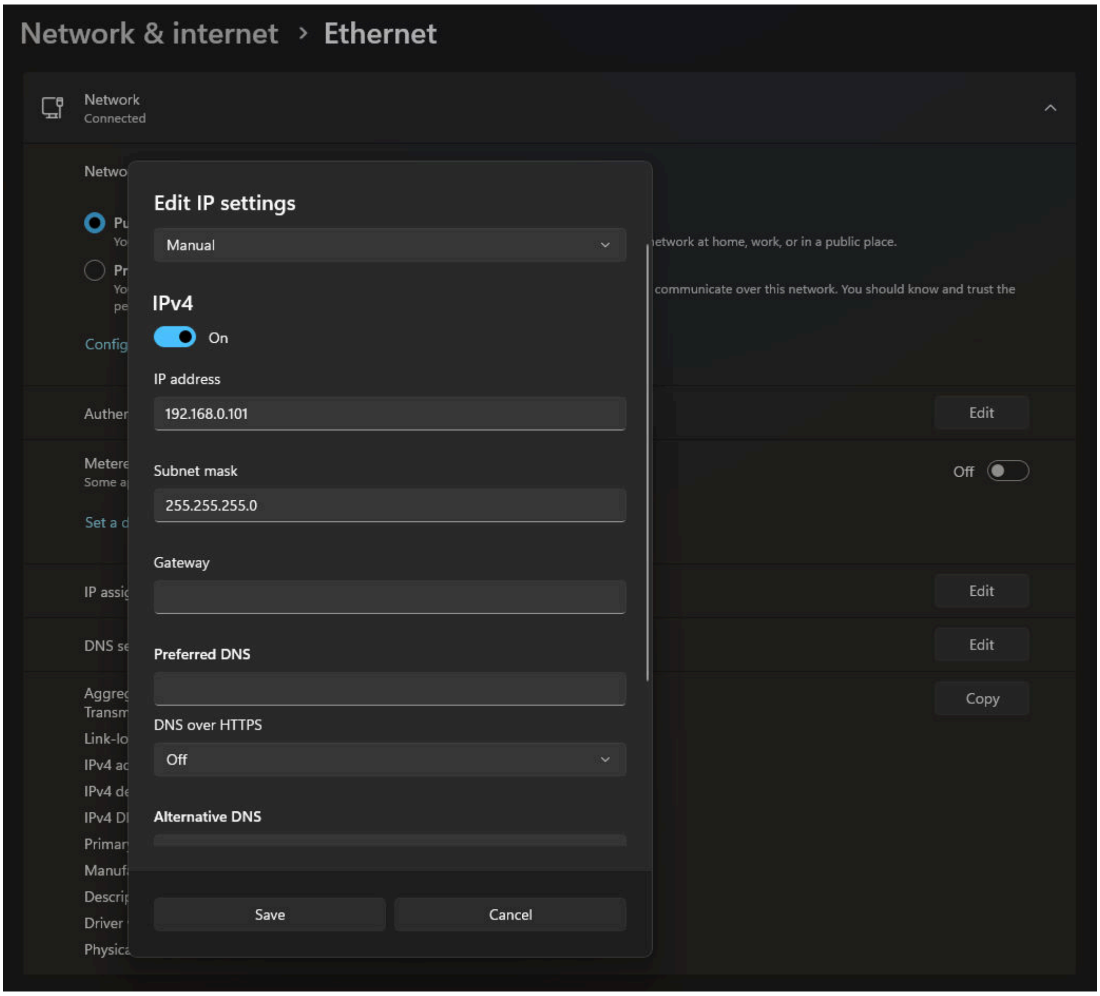
For Windows 11, open the *Settings* app and navigate to *Network & internet* and click on *Ethernet*. (For other operating systems guides exist online, search for “Setting static IP address in *my operating system*”.)



On this page, there is a row for the device’s IP assignment, click *Edit*.



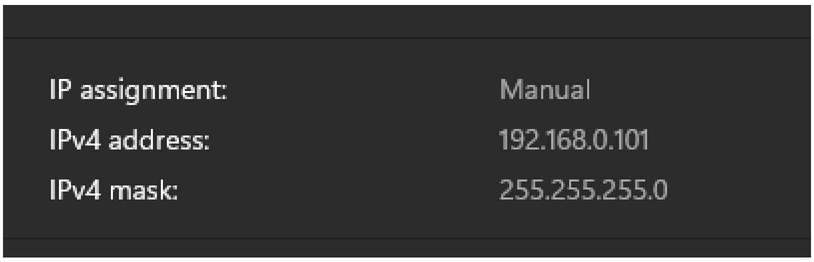
Select *Manual* in the dropdown. Then turn on the *IPv4* switch.



Fill in the fields you are presented with as follows:

- Set the IP address to 192.168.0.101, this will ensure that your computer is on the same network as the sensor bridge
- Set the subnet mask to 255.255.255.0
- The remaining fields can be left blank

Click *Save* to apply the settings.



The page should now tell you that your IP assignment is set to be manual, along with the configured IP address and subnet mask.

5. Setting the sensor bridge's IP address

Check that the sensor bridge is reachable on the network by pinging it at its default IP address, which is 192.168.0.100.

Table 1: SB1 Default network configuration

Default IP address	192.168.0.100
Default netmask	255.255.255.0
Default gateway	192.168.0.1

Decide what IP address the sensor bridge should have in your particular installation case.

Next up there are two methods for setting the sensor bridge's new IP address: Through a web browser, or over a Modbus connection.

Method 1: Set the IP address through a web browser

Open a web browser on your computer. Type 192.168.0.100 (the current IP address of the SB1) into the browser's address field and hit enter. If everything is working correctly, you should be greeted with the sensor bridge's setup page.

The section of the page labelled *Network Configuration* is what we will use here. Under *Update Settings*, write the new IP address into the field labelled *IP Address*.

You also need to fill in values for the netmask and the gateway address. If you want them changed, enter their new values into the relevant fields, otherwise enter the same value as is presented under *Current Settings*.

Hit the *Apply* button in order to apply and save the entered values on the sensor bridge.

Method 2: Set the IP address over Modbus

Download and install a Modbus client on your computer. E.g. the *Modbus Master Simulator* at http://www.en.radzio.dxp.pl/modbus-master-simulator/.

Set the server details as follows:

- IP address: 192.168.0.100
- Port: 502
- Unit/device-id: 1

Table 2: Map of registers used for device info including the network configuration

Address	Description	Type	Size (Registers)
40001-40016	Board name (ASCII)	STRING (32 bytes)	16
40017-40018	Hardware revision	UINT32	2

40019-40034	Device ID (ASCII)	STRING (32 bytes)	16
40035-40050	Application version (ASCII)	STRING (32 bytes)	16
40051-40066	Build version (ASCII)	STRING (32 bytes)	16
40067-40082	Serial number (ASCII)	STRING (32 bytes)	16
40083-40098	Hostname (ASCII)	STRING (32 bytes)	16
40099-40101	MAC address (48-bit)	UINT48	3
40102-40103	Static IP address (IPv4)	UINT32	2
40106-40107	Gateway (IPv4)	UINT32	2
40108-40109	Netmask (IPv4)	UINT32	2

Convert the new IP address for the sensor bridge to two UINT16 numbers (so that they can be written to the relevant registers) as follows: If the IP address is *a.b.c.d*, calculate the high UINT16 as *(a·256+b)*, and the low UINT16 as *(c·256+d)*.

To change the sensor bridge's Static IP address, write the high and low resulting numbers to the holding registers at address 40102 and 40103 respectively, as can be seen in table 2. (The Modbus function code for *Write Multiple Holding Registers* is 16.)

To also change the gateway address or netmask: First convert it to UINT16 numbers as described above. Then write the results to the registers for that particular setting, which can be found in table 2.

Table 3: Map of registers used for configuration activation & device control

Address	Description	Type	Size (Registers)
40600	Apply Configuration (1 = Apply, 2 = Save and Apply)	UINT16	1
40601	Reboot Command (1 = Reboot)	UINT16	1
40602	Sensor Reading Reload (1 = Automatic, 2 = Manual)	UINT16	1

To apply the new network configuration, write a 1 to the holding register at address 40600 (See table 3). (The Modbus function code for *Write Single Holding Register* is 6.)

Finishing up

Regardless of which method you used for setting the sensor bridge's new IP address some simple tests can be performed.

Ping the sensor bridge's default IP address of 192.168.0.100. It should not respond as it now has a different IP address configured.

To once again put your computer on the same network as the sensor bridge, edit your computer's static IP address as in installation step 4 of this document. This time set your IP address and subnet mask based on the network settings of your particular installation case.

Now your computer and the sensor bridge should be on the same network. To test, ping the sensor bridge's new IP address. This time it should respond.

If you set the sensor bridge's IP address over Modbus, there is one last step: To save the new network configuration in non-volatile RAM, write a 2 to the holding register at address 40600.

6. Registering the sensors with the sensor bridge

Access the automation controller's configuration.

A complete description of the Modbus protocol is outside the scope of this manual. Check your vendor's instructions for how to access Modbus communications from your particular automation controller.

Set up a Modbus client in the automation controller's configuration. Set the server details as follows:

- IP address: What you previously configured the sensor bridge with
- Port: 502
- Unit/device-id: 1

For each sensor that the sensor bridge should connect to, decide which of the sensor bridge's slots (from 1-8) that sensor should occupy.

Table 4: Map of registers used for the sensors' BLE addresses

Address	Description	Type	Size (Registers)
40500-40502	BLE Address - Sensor 1	UINT48	3
40503	Address Type - Sensor 1	UINT16	1
40504-40506	BLE Address - Sensor 2	UINT48	3
40507	Address Type - Sensor 2	UINT16	1
40508-40510	BLE Address - Sensor 3	UINT48	3
40511	Address Type - Sensor 3	UINT16	1
40512-40514	BLE Address - Sensor 4	UINT48	3
40515	Address Type - Sensor 4	UINT16	1
40516-40518	BLE Address - Sensor 5	UINT48	3
40519	Address Type - Sensor 5	UINT16	1

40520-40522	BLE Address - Sensor 6	UINT48	3
40523	Address Type - Sensor 6	UINT16	1
40524-40526	BLE Address - Sensor 7	UINT48	3
40527	Address Type - Sensor 7	UINT16	1
40528-40530	BLE Address - Sensor 8	UINT48	3
40531	Address Type - Sensor 8	UINT16	1

For each sensor, its BLE address will be registered to a particular slot. In order to do this we first need to convert the BLE address into three UINT16 numbers, so they can be written to the relevant registers. Take care to note that the BLE address is written in hexadecimal. If the BLE address is *a:b:c:d:e:f*, calculate the first UINT16 as $(a \cdot 256+b)$, the second UINT16 as $(c \cdot 256+d)$, and the third UINT16 as $(e \cdot 256+f)$.

With the BLE address converted, write the resulting numbers to the three holding registers for the relevant slot which can be found in table 4 as *BLE Address – Sensor n*. (E.g. to register a sensor to slot 3, write the first, second, and third resulting numbers to the registers at address 40508, 40509 and 40510 respectively.)

Furthermore, we need to specify whether the address is public or private. Write a 0 (public) or a 1 (private) to the holding register specified in table 4 as *Address Type - Sensor n* for the relevant slot. (Normally the address will be public.)

Repeat this process for each of the sensors.

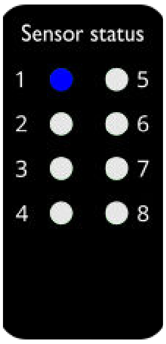
To both apply the sensor registration and save it in non-volatile RAM so it persists across reboots (recommended), write a 2 to the holding register at address 40600 (See table 3). To only apply the sensor registration (without saving it in non-volatile RAM), write a 1 to address 40600.

Even though it’s possible to save the sensor registration in the sensor bridge itself, it is still recommended to keep up-to-date sensor registration code in the automation controller. This is to ensure a consistent setup even if the sensor bridge needs replacing.

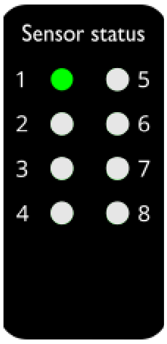
On the side of the sensor bridge there are eight LEDs indicating the status of each sensor slot. After having applied the sensor registration, observing these LEDs may be helpful:

a. A blue LED indicates that a connection to a sensor is being initiated
b. A solid green LED indicates that a connection to a sensor has been established
c. A blinking green LED indicates that data is being transmitted from the connected sensor

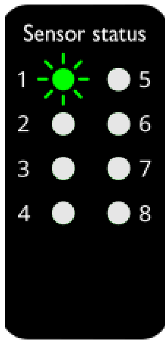
a.



b.



c.



When the code runs on the automation controller, the instructions to register the sensors to the specified slots will be written to the sensor bridge which will then initiate communication with the specified sensors.

The sensors' data will then be available from the sensor bridge at specific input registers; the addresses for these registers correspond to the slots to which the sensors were registered.

7. Configuring the sensors' standby behavior

Through the SB1, some aspects of the connected sensors' behavior can be configured. These all pertain to the sensors' behavior relating to standby mode. When a sensor is in standby mode it will not send values to the sensor bridge, it will only measure the bare minimum of what is needed to know when to leave standby mode. This is done to avoid needlessly wasting battery life when the readings are too low to be considered noteworthy.

Table 5: Map of registers used for sensor configuration. This block repeats for the eight sensors at addresses 41100, 41200, ..., 41800.

Address	Description	Type	Size (Registers)
41100-41101	Min RMS acceleration to detect motion (g)	FLOAT32	2
41102-41103	Acceleration delta to exit standby (g)	FLOAT32	2
41104	Time of no motion before standby (ms)	UINT16	1
41105	Sample rate during wake-on-motion standby (Hz)	UINT16	1

Each sensor has four parameters that can be configured (as can be seen in table 5):

- The *Min RMS acceleration to detect motion (g)* determines the minimum threshold of RMS acceleration that counts as motion.
- The *Acceleration delta to exit standby (g)* determines the minimum delta in acceleration between two successive measurements in standby mode which is needed to cause the sensor to leave standby mode.
- The *Time of no motion before standby (ms)* says for how long the device continually must be below the acceleration threshold before it enters standby mode.
- The *Sample rate during wake-on-motion standby (Hz)* determines at what rate measurements are taken when in standby mode, to see if the sensor should leave standby mode.

Table 6: Default sensor configuration

Min RMS acceleration to detect motion (g)	0.050
Acceleration delta to exit standby (g)	0.050
Time of no motion before standby (ms)	1000
Sample rate during wake-on-motion standby (Hz)	50

The sensor configurations are stored in holding registers according to table 5, especially note that the address block in this table repeats for the eight sensors (sensor slot 1, sensor slot 2, …, sensor slot 8) at addresses 41100, 41200, ..., 41800 respectively. By default the configuration for every connected sensor will be as seen in table 6.

Access the automation controller's configuration.

Let's take the example that we want to set the *Acceleration delta to exit standby* to 0.203125 g for the sensor we registered to slot 3. First, we need to convert the desired value of 0.203125 to the appropriate format, in this case a FLOAT32. This FLOAT32 value can then be split into its high 16 bits and its low 16 bits, which then can be written to the relevant registers (41302 and 41303 respectively, as seen in table 5).

To accomplish this, libraries exist for some programming languages. For example in python the whole conversion can be accomplished with *struct.unpack("!HH", struct.pack("!f", 0.203125)).* Check to see if your specific automation controller's environment supports operations like this.

If you instead one-off need to manually convert a decimal value to this format, the specification of a FLOAT32 is documented on https://www.sciencedirect.com/topics/computer-science/single-precision-format and the procedure for the conversion is described at https://en.wikipedia.org/wiki/Single-precision_floating-point_format#Converting_decimal_to_binary32. An example conversion will also be presented here:

To convert the decimal number 0.203125 to binary we find its binary fraction digits/bits one-by-one:

$$0.203125 \cdot 2 = 0.40625 = 0 + 0.40625 \Rightarrow b_{-1} = 0 \; (Doubling,\ the\ integer\ part\ is\ the\ first\ bit)$$

$$0.40625 \cdot 2 = 0.8125 = 0 + 0.8125 \Rightarrow b_{-2} = 0 \; (Repeating\ the\ process\ with\ the\ fraction\ part)$$

$$0.8125 \cdot 2 = 1.625 = 1 + 0.625 \Rightarrow b_{-3} = 1$$

$0.625 \cdot 2 = 1.25 = 1 + 0.25 \Rightarrow b_{-4} = 1$

$0.25 \cdot 2 = 0.5 = 0 + 0.5 \Rightarrow b_{-5} = 0$

$0.5 \cdot 2 = 1.0 = 1 + 0.0 \Rightarrow b_{-6} = 1$ $(Because\ the\ fraction\ part\ is\ zero\ at\ this\ point\ we\ stop)$

By reading the found binary digits, we see that the binary representation of 0.203125 is 0.001101. This value must next be normalized to the format $(1.b_{-1}b_{-2}b_{-3}...b_{-23})_2 \cdot 2^e$. This means shifting the value so there is a single 1 to the left of the binary point and introducing an exponent so it's still the same value. In our case: $0.001101 = 1.101 \cdot 2^{-3}$. So the exponent is -3, which makes the biased exponent used by the FLOAT32 format $127 + (-3) = 124$. The normalized binary fraction part is 10100000…. We also note that the sign is positive since $0.203125 > 0$.

To put this together to a FLOAT32 representation we append these binary numbers:

$sign = 0$ $(Meaning\ that\ the\ sign\ is\ positive)$

$biased\ exponent = 124_{10} = 01111100_2$ $(eight\ bits\ to\ represent\ this)$

$f = 10100000000000000000000_2$ $(23\ bits\ to\ represent\ the\ binary\ fraction\ part)$

$result = 0\ 01111100\ 10100000000000000000000_2 = 3E500000_{16} = 1045430272_{10}$

As a last step we then split the result up into two 16-bit high and low parts:

$high = 3E50_{16} = 15952_{10}$

$low = 0000_{16} = 0_{10}$

With the value converted to the desired format, we are ready to write the high and low resulting numbers (in decimal 15952 and 0) to the two relevant holding registers (41302 and 41303 respectively). (The Modbus function code for *Write Multiple Holding Registers* is 16.)

Repeat this process for each setting you wish to configure for each of the sensors.

To both apply the sensor configuration and save it in non-volatile RAM so it persists across reboots (recommended), write a 2 to the holding register at address 40600 (See table 3). To only apply the sensor configuration (without saving it in non-volatile RAM), write a 1 to address 40600.

As before, even though it's possible to save the sensor configuration in the sensor bridge itself, it is still recommended to keep up-to-date sensor configuration code in the automation controller. This is to ensure a consistent setup even if the sensor bridge needs replacing.

When the code (produced by following the instructions above) runs on the automation controller, the instructions to configure the sensors will be written to the SB1. The SB1 will then in turn talk to the sensors themselves to make them configure as specified, and therefore behave as desired.

8. Controlling when the sensor bridge presents new data from sensors

The SB1 supports two different behaviors for when to present new data from sensors at Modbus registers. Either you manually tell the SB1 when to reload the registers with sensor data, or you let those registers be automatically and individually updated as each new value becomes available. This is controlled by setting *Sensor Reading Reload* to manual or automatic. The current setting of *Sensor Reading Reload* is stored in the holding register at address 40602, and should either be a 1 for automatic, or a 2 for manual (see table 3). The default value is 1.

If *Sensor Reading Reload* is set to automatic, the registers which the SB1 presents containing data from sensors (listed in tables in later sections) will each be individually updated as soon as new data becomes available to the SB1.

If *Sensor Reading Reload* is set to manual, the registers which the SB1 presents containing data from sensors will all be updated at the same time and only when the SB1 is instructed to do so (by writing a 2 to the holding register at address 40602). The values stored in these registers will then not change until the SB1 receives either another instruction for a manual update, or a signal to switch *Sensor Reading Reload* to automatic.

Recommended automatic usage: Make sure the holding register at address 40602 contains a 1. Read the values you are interested in (as presented in later sections) as and when you need them. If you want to be sure that the readings you get are from the same point in time, you need to read input registers of a range of addresses, but you cannot read all of the registers in this fashion as there is simply too much data.

Recommended manual usage: Write a 2 to the holding register at address 40602, then read all of the sensor values you are interested in (as presented in later sections). Once you want to initiate another round of reading, write a 2 again to update all of the registers with data from sensors, and proceed to read the desired values again. Repeat this process.

While the automatic method can get you a more recent reading, it risks putting you in a situation where successive readings don't contain sensor data that was collected concurrently as new sensor data may have appeared between the readings, thus making it difficult to use many collected data points together to reach conclusions. The manual method pauses the SB1 from introducing new sensor data to the registers until it is instructed to do so.

9. Accessing the sensor acceleration readings

Access the automation controller's configuration.

Table 7: Map of registers used for the sensor acceleration readings

Address	Description	Type	Size (Registers)
33000-33001	RMS acceleration in X axis (mm/s²) - Sensor 1	INT32	2
33002-33003	Maximum recorded acc. in X axis (mm/s²) - Sensor 1	INT32	2
33004-33005	RMS acceleration in Y axis (mm/s²) - Sensor 1	INT32	2
33006-33007	Maximum recorded acc. in Y axis (mm/s²) - Sensor 1	INT32	2
33008-33009	RMS acceleration in Z axis (mm/s²) - Sensor 1	INT32	2
33010-33011	Maximum recorded acc. in Z axis (mm/s²) - Sensor 1	INT32	2
33012-33013	RMS acceleration in X axis (mm/s²) - Sensor 2	INT32	2
33014-33015	Maximum recorded acc. in X axis (mm/s²) - Sensor 2	INT32	2
33016-33017	RMS acceleration in Y axis (mm/s²) - Sensor 2	INT32	2
33018-33019	Maximum recorded acc. in Y axis (mm/s²) - Sensor 2	INT32	2
33020-33021	RMS acceleration in Z axis (mm/s²) - Sensor 2	INT32	2
33022-33023	Maximum recorded acc. in Z axis (mm/s²) - Sensor 2	INT32	2
33024-33025	RMS acceleration in X axis (mm/s²) - Sensor 3	INT32	2
33026-33027	Maximum recorded acc. in X axis (mm/s²) - Sensor 3	INT32	2
33028-33029	RMS acceleration in Y axis (mm/s²) - Sensor 3	INT32	2
33030-33031	Maximum recorded acc. in Y axis (mm/s²) - Sensor 3	INT32	2
33032-33033	RMS acceleration in Z axis (mm/s²) - Sensor 3	INT32	2
33034-33035	Maximum recorded acc. in Z axis (mm/s²) - Sensor 3	INT32	2
33036-33037	RMS acceleration in X axis (mm/s²) - Sensor 4	INT32	2
33038-33039	Maximum recorded acc. in X axis (mm/s²) - Sensor 4	INT32	2
33040-33041	RMS acceleration in Y axis (mm/s²) - Sensor 4	INT32	2
33042-33043	Maximum recorded acc. in Y axis (mm/s²) - Sensor 4	INT32	2
33044-33045	RMS acceleration in Z axis (mm/s²) - Sensor 4	INT32	2
33046-33047	Maximum recorded acc. in Z axis (mm/s²) - Sensor 4	INT32	2
33048-33049	RMS acceleration in X axis (mm/s²) - Sensor 5	INT32	2
33050-33051	Maximum recorded acc. in X axis (mm/s²) - Sensor 5	INT32	2
33052-33053	RMS acceleration in Y axis (mm/s²) - Sensor 5	INT32	2
33054-33055	Maximum recorded acc. in Y axis (mm/s²) - Sensor 5	INT32	2
33056-33057	RMS acceleration in Z axis (mm/s²) - Sensor 5	INT32	2
33058-33059	Maximum recorded acc. in Z axis (mm/s²) - Sensor 5	INT32	2
33060-33061	RMS acceleration in X axis (mm/s²) - Sensor 6	INT32	2

Address	Description	Type	Size (Registers)
33062-33063	Maximum recorded acc. in X axis (mm/s²) - Sensor 6	INT32	2
33064-33065	RMS acceleration in Y axis (mm/s²) - Sensor 6	INT32	2
33066-33067	Maximum recorded acc. in Y axis (mm/s²) - Sensor 6	INT32	2
33068-33069	RMS acceleration in Z axis (mm/s²) - Sensor 6	INT32	2
33070-33071	Maximum recorded acc. in Z axis (mm/s²) - Sensor 6	INT32	2
33072-33073	RMS acceleration in X axis (mm/s²) - Sensor 7	INT32	2
33074-33075	Maximum recorded acc. in X axis (mm/s²) - Sensor 7	INT32	2
33076-33077	RMS acceleration in Y axis (mm/s²) - Sensor 7	INT32	2
33078-33079	Maximum recorded acc. in Y axis (mm/s²) - Sensor 7	INT32	2
33080-33081	RMS acceleration in Z axis (mm/s²) - Sensor 7	INT32	2
33082-33083	Maximum recorded acc. in Z axis (mm/s²) - Sensor 7	INT32	2
33084-33085	RMS acceleration in X axis (mm/s²) - Sensor 8	INT32	2
33086-33087	Maximum recorded acc. in X axis (mm/s²) - Sensor 8	INT32	2
33088-33089	RMS acceleration in Y axis (mm/s²) - Sensor 8	INT32	2
33090-33091	Maximum recorded acc. in Y axis (mm/s²) - Sensor 8	INT32	2
33092-33093	RMS acceleration in Z axis (mm/s²) - Sensor 8	INT32	2
33094-33095	Maximum recorded acc. in Z axis (mm/s²) - Sensor 8	INT32	2

The readings from each sensor slot will be available at input registers according to table 7. So if we e.g. want to access the Z-axis RMS acceleration for the sensor we registered to slot 2, we would read the two input registers starting at address 33020. (The Modbus function code for *Read Input Registers* is 4.)

If a sensor is not working, all of its values will be 0.

To avoid having to perform a large number of read operations for individual values, we can instead perform a single read operation for a whole block of addresses within the sensor acceleration readings address space. To do this, first understand which address range you wish to read by looking at table 7. The data can then be accessed by reading input registers at the address of the beginning of the range, and providing the length of the range as the amount of registers to read. For example if we wish to get all the acceleration readings for the sensors at slots 1, 2, and 3, we would read input registers at address 33000 with a length of 36 registers. One benefit of this approach, if you have *Sensor Reading Reload* set to automatic, is that you get a snapshot of the state of multiple readings, instead of a slight delay between successive readings.

Once the desired data has been accessed, it can be stored in variables and then be used for, e.g., predictive maintenance or process optimization.

10. Accessing the aggregated sensor values

Access the automation controller's configuration.

Table 8: Map of registers used for the aggregated sensor values (all values presented in this table are of type FLOAT32 and are two registers in size)

Address	Description
34000-34001	Root mean square amplitude of acceleration in X axis (m/s^2) - Sensor 1
34002-34003	Root mean square amplitude of acceleration in Y axis (m/s^2) - Sensor 1
34004-34005	Root mean square amplitude of acceleration in Z axis (m/s^2) - Sensor 1
34006-34007	Root mean square amplitude of acceleration in X axis (m/s^2) - Sensor 2
34008-34009	Root mean square amplitude of acceleration in Y axis (m/s^2) - Sensor 2
34010-34011	Root mean square amplitude of acceleration in Z axis (m/s^2) - Sensor 2
34012-34013	Root mean square amplitude of acceleration in X axis (m/s^2) - Sensor 3
34014-34015	Root mean square amplitude of acceleration in Y axis (m/s^2) - Sensor 3
34016-34017	Root mean square amplitude of acceleration in Z axis (m/s^2) - Sensor 3
34018-34019	Root mean square amplitude of acceleration in X axis (m/s^2) - Sensor 4
34020-34021	Root mean square amplitude of acceleration in Y axis (m/s^2) - Sensor 4
34022-34023	Root mean square amplitude of acceleration in Z axis (m/s^2) - Sensor 4
34024-34025	Root mean square amplitude of acceleration in X axis (m/s^2) - Sensor 5
34026-34027	Root mean square amplitude of acceleration in Y axis (m/s^2) - Sensor 5
34028-34029	Root mean square amplitude of acceleration in Z axis (m/s^2) - Sensor 5
34030-34031	Root mean square amplitude of acceleration in X axis (m/s^2) - Sensor 6
34032-34033	Root mean square amplitude of acceleration in Y axis (m/s^2) - Sensor 6
34034-34035	Root mean square amplitude of acceleration in Z axis (m/s^2) - Sensor 6
34036-34037	Root mean square amplitude of acceleration in X axis (m/s^2) - Sensor 7
34038-34039	Root mean square amplitude of acceleration in Y axis (m/s^2) - Sensor 7
34040-34041	Root mean square amplitude of acceleration in Z axis (m/s^2) - Sensor 7
34042-34043	Root mean square amplitude of acceleration in X axis (m/s^2) - Sensor 8
34044-34045	Root mean square amplitude of acceleration in Y axis (m/s^2) - Sensor 8
34046-34047	Root mean square amplitude of acceleration in Z axis (m/s^2) - Sensor 8
34048-34049	Peak amplitude of acceleration in X axis (m/s^2) - Sensor 1
34050-34051	Peak amplitude of acceleration in Y axis (m/s^2) - Sensor 1
34052-34053	Peak amplitude of acceleration in Z axis (m/s^2) - Sensor 1
34054-34055	Peak amplitude of acceleration in X axis (m/s^2) - Sensor 2
34056-34057	Peak amplitude of acceleration in Y axis (m/s^2) - Sensor 2
34058-34059	Peak amplitude of acceleration in Z axis (m/s^2) - Sensor 2
34060-34061	Peak amplitude of acceleration in X axis (m/s^2) - Sensor 3

Address	Description
34062-34063	Peak amplitude of acceleration in Y axis (m/s²) - Sensor 3
34064-34065	Peak amplitude of acceleration in Z axis (m/s²) - Sensor 3
34066-34067	Peak amplitude of acceleration in X axis (m/s²) - Sensor 4
34068-34069	Peak amplitude of acceleration in Y axis (m/s²) - Sensor 4
34070-34071	Peak amplitude of acceleration in Z axis (m/s²) - Sensor 4
34072-34073	Peak amplitude of acceleration in X axis (m/s²) - Sensor 5
34074-34075	Peak amplitude of acceleration in Y axis (m/s²) - Sensor 5
34076-34077	Peak amplitude of acceleration in Z axis (m/s²) - Sensor 5
34078-34079	Peak amplitude of acceleration in X axis (m/s²) - Sensor 6
34080-34081	Peak amplitude of acceleration in Y axis (m/s²) - Sensor 6
34082-34083	Peak amplitude of acceleration in Z axis (m/s²) - Sensor 6
34084-34085	Peak amplitude of acceleration in X axis (m/s²) - Sensor 7
34086-34087	Peak amplitude of acceleration in Y axis (m/s²) - Sensor 7
34088-34089	Peak amplitude of acceleration in Z axis (m/s²) - Sensor 7
34090-34091	Peak amplitude of acceleration in X axis (m/s²) - Sensor 8
34092-34093	Peak amplitude of acceleration in Y axis (m/s²) - Sensor 8
34094-34095	Peak amplitude of acceleration in Z axis (m/s²) - Sensor 8
34096-34097	Root mean square amplitude of velocity in X axis (m/s) - Sensor 1
34098-34099	Root mean square amplitude of velocity in Y axis (m/s) - Sensor 1
34100-34101	Root mean square amplitude of velocity in Z axis (m/s) - Sensor 1
34102-34103	Root mean square amplitude of velocity in X axis (m/s) - Sensor 2
34104-34105	Root mean square amplitude of velocity in Y axis (m/s) - Sensor 2
34106-34107	Root mean square amplitude of velocity in Z axis (m/s) - Sensor 2
34108-34109	Root mean square amplitude of velocity in X axis (m/s) - Sensor 3
34110-34111	Root mean square amplitude of velocity in Y axis (m/s) - Sensor 3
34112-34113	Root mean square amplitude of velocity in Z axis (m/s) - Sensor 3
34114-34115	Root mean square amplitude of velocity in X axis (m/s) - Sensor 4
34116-34117	Root mean square amplitude of velocity in Y axis (m/s) - Sensor 4
34118-34119	Root mean square amplitude of velocity in Z axis (m/s) - Sensor 4
34120-34121	Root mean square amplitude of velocity in X axis (m/s) - Sensor 5
34122-34123	Root mean square amplitude of velocity in Y axis (m/s) - Sensor 5
34124-34125	Root mean square amplitude of velocity in Z axis (m/s) - Sensor 5
34126-34127	Root mean square amplitude of velocity in X axis (m/s) - Sensor 6
34128-34129	Root mean square amplitude of velocity in Y axis (m/s) - Sensor 6
34130-34131	Root mean square amplitude of velocity in Z axis (m/s) - Sensor 6

Address	Description
34132-34133	Root mean square amplitude of velocity in X axis (m/s) - Sensor 7
34134-34135	Root mean square amplitude of velocity in Y axis (m/s) - Sensor 7
34136-34137	Root mean square amplitude of velocity in Z axis (m/s) - Sensor 7
34138-34139	Root mean square amplitude of velocity in X axis (m/s) - Sensor 8
34140-34141	Root mean square amplitude of velocity in Y axis (m/s) - Sensor 8
34142-34143	Root mean square amplitude of velocity in Z axis (m/s) - Sensor 8
34144-34145	Peak amplitude of velocity in X axis (m/s) - Sensor 1
34146-34147	Peak amplitude of velocity in Y axis (m/s) - Sensor 1
34148-34149	Peak amplitude of velocity in Z axis (m/s) - Sensor 1
34150-34151	Peak amplitude of velocity in X axis (m/s) - Sensor 2
34152-34153	Peak amplitude of velocity in Y axis (m/s) - Sensor 2
34154-34155	Peak amplitude of velocity in Z axis (m/s) - Sensor 2
34156-34157	Peak amplitude of velocity in X axis (m/s) - Sensor 3
34158-34159	Peak amplitude of velocity in Y axis (m/s) - Sensor 3
34160-34161	Peak amplitude of velocity in Z axis (m/s) - Sensor 3
34162-34163	Peak amplitude of velocity in X axis (m/s) - Sensor 4
34164-34165	Peak amplitude of velocity in Y axis (m/s) - Sensor 4
34166-34167	Peak amplitude of velocity in Z axis (m/s) - Sensor 4
34168-34169	Peak amplitude of velocity in X axis (m/s) - Sensor 5
34170-34171	Peak amplitude of velocity in Y axis (m/s) - Sensor 5
34172-34173	Peak amplitude of velocity in Z axis (m/s) - Sensor 5
34174-34175	Peak amplitude of velocity in X axis (m/s) - Sensor 6
34176-34177	Peak amplitude of velocity in Y axis (m/s) - Sensor 6
34178-34179	Peak amplitude of velocity in Z axis (m/s) - Sensor 6
34180-34181	Peak amplitude of velocity in X axis (m/s) - Sensor 7
34182-34183	Peak amplitude of velocity in Y axis (m/s) - Sensor 7
34184-34185	Peak amplitude of velocity in Z axis (m/s) - Sensor 7
34186-34187	Peak amplitude of velocity in X axis (m/s) - Sensor 8
34188-34189	Peak amplitude of velocity in Y axis (m/s) - Sensor 8
34190-34191	Peak amplitude of velocity in Z axis (m/s) - Sensor 8
34192-34193	Peak-to-peak amplitude of displacement in X axis (m) - Sensor 1
34194-34195	Peak-to-peak amplitude of displacement in Y axis (m) - Sensor 1
34196-34197	Peak-to-peak amplitude of displacement in Z axis (m) - Sensor 1
34198-34199	Peak-to-peak amplitude of displacement in X axis (m) - Sensor 2
34200-34201	Peak-to-peak amplitude of displacement in Y axis (m) - Sensor 2

Address	Description
34202-34203	Peak-to-peak amplitude of displacement in Z axis (m) - Sensor 2
34204-34205	Peak-to-peak amplitude of displacement in X axis (m) - Sensor 3
34206-34207	Peak-to-peak amplitude of displacement in Y axis (m) - Sensor 3
34208-34209	Peak-to-peak amplitude of displacement in Z axis (m) - Sensor 3
34210-34211	Peak-to-peak amplitude of displacement in X axis (m) - Sensor 4
34212-34213	Peak-to-peak amplitude of displacement in Y axis (m) - Sensor 4
34214-34215	Peak-to-peak amplitude of displacement in Z axis (m) - Sensor 4
34216-34217	Peak-to-peak amplitude of displacement in X axis (m) - Sensor 5
34218-34219	Peak-to-peak amplitude of displacement in Y axis (m) - Sensor 5
34220-34221	Peak-to-peak amplitude of displacement in Z axis (m) - Sensor 5
34222-34223	Peak-to-peak amplitude of displacement in X axis (m) - Sensor 6
34224-34225	Peak-to-peak amplitude of displacement in Y axis (m) - Sensor 6
34226-34227	Peak-to-peak amplitude of displacement in Z axis (m) - Sensor 6
34228-34229	Peak-to-peak amplitude of displacement in X axis (m) - Sensor 7
34230-34231	Peak-to-peak amplitude of displacement in Y axis (m) - Sensor 7
34232-34233	Peak-to-peak amplitude of displacement in Z axis (m) - Sensor 7
34234-34235	Peak-to-peak amplitude of displacement in X axis (m) - Sensor 8
34236-34237	Peak-to-peak amplitude of displacement in Y axis (m) - Sensor 8
34238-34239	Peak-to-peak amplitude of displacement in Z axis (m) - Sensor 8
34240-34241	Planar stroke calculated with method A in XY plane (m) - Sensor 1
34242-34243	Planar stroke calculated with method A in YZ plane (m) - Sensor 1
34244-34245	Planar stroke calculated with method A in XZ plane (m) - Sensor 1
34246-34247	Planar stroke calculated with method A in XY plane (m) - Sensor 2
34248-34249	Planar stroke calculated with method A in YZ plane (m) - Sensor 2
34250-34251	Planar stroke calculated with method A in XZ plane (m) - Sensor 2
34252-34253	Planar stroke calculated with method A in XY plane (m) - Sensor 3
34254-34255	Planar stroke calculated with method A in YZ plane (m) - Sensor 3
34256-34257	Planar stroke calculated with method A in XZ plane (m) - Sensor 3
34258-34259	Planar stroke calculated with method A in XY plane (m) - Sensor 4
34260-34261	Planar stroke calculated with method A in YZ plane (m) - Sensor 4
34262-34263	Planar stroke calculated with method A in XZ plane (m) - Sensor 4
34264-34265	Planar stroke calculated with method A in XY plane (m) - Sensor 5
34266-34267	Planar stroke calculated with method A in YZ plane (m) - Sensor 5
34268-34269	Planar stroke calculated with method A in XZ plane (m) - Sensor 5
34270-34271	Planar stroke calculated with method A in XY plane (m) - Sensor 6

Address	Description
34272-34273	Planar stroke calculated with method A in YZ plane (m) - Sensor 6
34274-34275	Planar stroke calculated with method A in XZ plane (m) - Sensor 6
34276-34277	Planar stroke calculated with method A in XY plane (m) - Sensor 7
34278-34279	Planar stroke calculated with method A in YZ plane (m) - Sensor 7
34280-34281	Planar stroke calculated with method A in XZ plane (m) - Sensor 7
34282-34283	Planar stroke calculated with method A in XY plane (m) - Sensor 8
34284-34285	Planar stroke calculated with method A in YZ plane (m) - Sensor 8
34286-34287	Planar stroke calculated with method A in XZ plane (m) - Sensor 8
34288-34289	Planar stroke calculated with method B in XY plane (m) - Sensor 1
34290-34291	Planar stroke calculated with method B in YZ plane (m) - Sensor 1
34292-34293	Planar stroke calculated with method B in XZ plane (m) - Sensor 1
34294-34295	Planar stroke calculated with method B in XY plane (m) - Sensor 2
34296-34297	Planar stroke calculated with method B in YZ plane (m) - Sensor 2
34298-34299	Planar stroke calculated with method B in XZ plane (m) - Sensor 2
34300-34301	Planar stroke calculated with method B in XY plane (m) - Sensor 3
34302-34303	Planar stroke calculated with method B in YZ plane (m) - Sensor 3
34304-34305	Planar stroke calculated with method B in XZ plane (m) - Sensor 3
34306-34307	Planar stroke calculated with method B in XY plane (m) - Sensor 4
34308-34309	Planar stroke calculated with method B in YZ plane (m) - Sensor 4
34310-34311	Planar stroke calculated with method B in XZ plane (m) - Sensor 4
34312-34313	Planar stroke calculated with method B in XY plane (m) - Sensor 5
34314-34315	Planar stroke calculated with method B in YZ plane (m) - Sensor 5
34316-34317	Planar stroke calculated with method B in XZ plane (m) - Sensor 5
34318-34319	Planar stroke calculated with method B in XY plane (m) - Sensor 6
34320-34321	Planar stroke calculated with method B in YZ plane (m) - Sensor 6
34322-34323	Planar stroke calculated with method B in XZ plane (m) - Sensor 6
34324-34325	Planar stroke calculated with method B in XY plane (m) - Sensor 7
34326-34327	Planar stroke calculated with method B in YZ plane (m) - Sensor 7
34328-34329	Planar stroke calculated with method B in XZ plane (m) - Sensor 7
34330-34331	Planar stroke calculated with method B in XY plane (m) - Sensor 8
34332-34333	Planar stroke calculated with method B in YZ plane (m) - Sensor 8
34334-34335	Planar stroke calculated with method B in XZ plane (m) - Sensor 8
34336-34337	Frequency of the highest spectral peak in X axis (Hz) - Sensor 1
34338-34339	Frequency of the highest spectral peak in Y axis (Hz) - Sensor 1
34340-34341	Frequency of the highest spectral peak in Z axis (Hz) - Sensor 1

Address	Description
34342-34343	Frequency of the highest spectral peak in X axis (Hz) - Sensor 2
34344-34345	Frequency of the highest spectral peak in Y axis (Hz) - Sensor 2
34346-34347	Frequency of the highest spectral peak in Z axis (Hz) - Sensor 2
34348-34349	Frequency of the highest spectral peak in X axis (Hz) - Sensor 3
34350-34351	Frequency of the highest spectral peak in Y axis (Hz) - Sensor 3
34352-34353	Frequency of the highest spectral peak in Z axis (Hz) - Sensor 3
34354-34355	Frequency of the highest spectral peak in X axis (Hz) - Sensor 4
34356-34357	Frequency of the highest spectral peak in Y axis (Hz) - Sensor 4
34358-34359	Frequency of the highest spectral peak in Z axis (Hz) - Sensor 4
34360-34361	Frequency of the highest spectral peak in X axis (Hz) - Sensor 5
34362-34363	Frequency of the highest spectral peak in Y axis (Hz) - Sensor 5
34364-34365	Frequency of the highest spectral peak in Z axis (Hz) - Sensor 5
34366-34367	Frequency of the highest spectral peak in X axis (Hz) - Sensor 6
34368-34369	Frequency of the highest spectral peak in Y axis (Hz) - Sensor 6
34370-34371	Frequency of the highest spectral peak in Z axis (Hz) - Sensor 6
34372-34373	Frequency of the highest spectral peak in X axis (Hz) - Sensor 7
34374-34375	Frequency of the highest spectral peak in Y axis (Hz) - Sensor 7
34376-34377	Frequency of the highest spectral peak in Z axis (Hz) - Sensor 7
34378-34379	Frequency of the highest spectral peak in X axis (Hz) - Sensor 8
34380-34381	Frequency of the highest spectral peak in Y axis (Hz) - Sensor 8
34382-34383	Frequency of the highest spectral peak in Z axis (Hz) - Sensor 8
34384-34385	Crest factor of acceleration in X axis - Sensor 1
34386-34387	Crest factor of acceleration in Y axis - Sensor 1
34388-34389	Crest factor of acceleration in Z axis - Sensor 1
34390-34391	Crest factor of acceleration in X axis - Sensor 2
34392-34393	Crest factor of acceleration in Y axis - Sensor 2
34394-34395	Crest factor of acceleration in Z axis - Sensor 2
34396-34397	Crest factor of acceleration in X axis - Sensor 3
34398-34399	Crest factor of acceleration in Y axis - Sensor 3
34400-34401	Crest factor of acceleration in Z axis - Sensor 3
34402-34403	Crest factor of acceleration in X axis - Sensor 4
34404-34405	Crest factor of acceleration in Y axis - Sensor 4
34406-34407	Crest factor of acceleration in Z axis - Sensor 4
34408-34409	Crest factor of acceleration in X axis - Sensor 5
34410-34411	Crest factor of acceleration in Y axis - Sensor 5

Address	Description
34412-34413	Crest factor of acceleration in Z axis - Sensor 5
34414-34415	Crest factor of acceleration in X axis - Sensor 6
34416-34417	Crest factor of acceleration in Y axis - Sensor 6
34418-34419	Crest factor of acceleration in Z axis - Sensor 6
34420-34421	Crest factor of acceleration in X axis - Sensor 7
34422-34423	Crest factor of acceleration in Y axis - Sensor 7
34424-34425	Crest factor of acceleration in Z axis - Sensor 7
34426-34427	Crest factor of acceleration in X axis - Sensor 8
34428-34429	Crest factor of acceleration in Y axis - Sensor 8
34430-34431	Crest factor of acceleration in Z axis - Sensor 8

Look in table 8 to see which input registers contain each specific reading for each sensor slot. If we e.g. want to access the *Peak amplitude of velocity in Y axis (m/s)* for the sensor we registered to slot 2, we would read the two input registers starting at address 34152. (The Modbus function code for *Read Input Registers* is 4.)

If a sensor is not working, all of its values will be 0.

To avoid having to perform a large number of read operations for individual values, we can instead perform a single read operation for a whole block of addresses within the aggregated sensor values address space. To do this, first understand which address range you wish to read by looking at table 8. The data can then be accessed by reading input registers at the address of the beginning of the range, and providing the length of the range as the amount of registers to read. For example if we wish to get the *Crest factor of acceleration* in X, Y, and Z axis for the sensors at slots 3, 4, and 5, we would read input registers at address 34396 with a length of 18 registers. One benefit of this approach, if you have *Sensor Reading Reload* set to automatic, is that you get a snapshot of the state of multiple readings, instead of a slight delay between successive readings.

Once the desired data has been accessed, it can be stored in variables and then be used for, e.g., predictive maintenance or process optimization.

11. Accessing the sensor health data

Access the automation controller's configuration.

Table 9: Map of registers used for the sensor health data. This block repeats for the eight sensors at addresses 31100, 31200, ..., 31800.

Address	Description	Type	Size (Registers)
31100-31101	Sensor uptime (seconds)	UINT32	2
31102	Reboot count	UINT16	1
31103	Reset cause	UINT16	1
31104	Temperature (x100 °C)	INT16	1

Address	Description	Type	Size (Registers)
31105	Battery voltage (mV)	UINT16	1
31106	RSSI (dBm x100)	INT16	1
31107	Energy harvesting voltage (mV)	UINT16	1
31108-31109	Clock sync skew	FLOAT32	2
31110-31111	Clock sync age (ms)	INT32	2
31112-31113	Clock sync diff	INT32	2
31114	Health data age (seconds)	UINT16	1

The health data for each sensor will be available at input registers according to table 9. So if we e.g. want to access the *Battery voltage* of the sensor we registered to slot 4, we would read the input register at address 31405.

If a sensor is not working all of its values will be 0, except for the *Health data age* value which will be 0xFFFF.

As before, we can perform a single read operation for a block of addresses within the sensor health data address space (see table 9). However, note that in this case the block read in each single read operation needs to be contained to only one sensor's health data, as there are unused registers between the health data for different sensors. I.e. all of the health data for one sensor can be read together, but health data for multiple sensors cannot be read together.

Once the desired health data has been accessed, it can be stored in variables and then be used for e.g. monitoring the sensors' operational conditions.

12. Testing the installation

Observe the *Sensor status* LEDs on the side of the SB1 unit, they should be green for the sensor slots that are in use and blink when data is transmitted from each sensor.

Connect your computer to the Ethernet switch and use a Modbus client to read the sensors' acceleration readings. Check that they are live and non-zero.

Monitor the automation controller's operation and variables to see that it is behaving as expected.

TROUBLESHOOTING

For issues related to your automation controller, check with the relevant vendor.

Sensor bridge

- Make sure the sensor bridge is plugged into a powered PoE port on the Ethernet switch, otherwise it will not receive power.
- If you have trouble reaching the sensor bridge or have set an incorrect configuration for it, you can retrieve the IP address by pinging the sensor bridge by its hostname. If the sensor bridge's ID (found on the casing) is *AA:BB:CC:DD:EE:FF*, its hostname is *anura-aabbccddeeff.local* (in lowercase, without the colons from the ID).
- Double check with the register map tables that you are reading and writing the correct registers for each operation.

Network

- If you can't reach other devices through the Ethernet switch, check to see that the switch's configuration is as you expect.
- Make sure you don't set the same IP address for multiple devices on the network.
- Make sure all of the relevant devices have IP addresses and subnet masks configured so that they are on the same network.

Sensors

- Make sure the sensors are within range for the sensor bridge to reach them. Check the *Sensor status* LEDs on the side of the SB1 unit, and that the LEDs for the used sensor slots are green.
- Make sure you haven't gotten two sensors mixed up: Check which physical sensor has which BLE address, and which BLE address has been registered to which slot.
- If a sensor is behaving in an unexpected way, you can see if the health data for that sensor indicates any issues.

FIRMWARE UPDATES

The SB1 supports upgrades using the Ethernet connection, firmware updates can be performed through the setup page reached by entering the sensor bridge's IP address into a web browser address field.

PRODUCT CARE

To ensure the longevity and optimal performance of SB1, please follow these care instructions:

General use:

Do not drop, throw, or subject the product to excessive force, as this could damage the plastic casing, aluminum plate, or internal components.

Cleaning:

Use a soft, damp cloth to gently clean the plastic casing and aluminum bottom plate. Avoid abrasive materials or harsh cleaning agents, as they may scratch the surfaces or damage the finish.

SUPPORT, WARRANTY & RMA ASSISTANCE

For help with product support, warranty claims, or initiating an RMA (Return Merchandise Authorization), our website provides all the resources needed.

https://revibeenergy.com/

RECYCLING

Disposal of Electrical and Electronic Equipment
This product is marked with the crossed-out wheelie bin symbol to indicate that it must not be disposed of as general household waste. Instead, it should be taken to an appropriate collection point for recycling electrical and electronic equipment. Proper disposal helps prevent potential harm to the environment and human health and promotes the sustainable reuse of materials. For more detailed information on disposal and recycling, please contact your local authorities or the retailer where the product was purchased.

SB1 TECHNICAL SPECIFICATIONS

Power supply:

PoE, supporting IEEE 802af.

Typical Power consumption:

1.2 W

Enclosure material:

Bottom plate: Hard anodized (type III) aluminum alloy.
Casing: PA6, Black.

Ingress protection:

IP65

Typical weight:

560g.

Dimensions: (excluding mounting accessories.)

140x98x60 (height x width x depth)

Operating Temperature:

-40°C to +80°C

Storage Temperature:

-40°C to +80°C (-40°F to +140°F)

Relative humidity:

0 to 95%, non-condensing

Mounting interface:

3x Pot magnets / Universal AMPS 4 hole pattern, 30x38mm.

Input connections:

PoE, IEEE 802 af.
10/100 Ethernet on RJ45, Neutrik etherCON CAT6a required for IP65.
Network Connections 10/100/BASE-T Ethernet on CAT6a: up to 100m

Wireless Communication:

2.4GHz

Connections:

Up to 8

Tx Power:

Typ. 0 dBm

Rx Sensitivity:

-98 dBm

Data Rates:

1 Mbps

Max data throughput:

4 sensors
Sample rate (Hz): 1024
Sample length (seconds): 5
Number of samples: 5120

Snippet interval (seconds): 60

Frequency:

2.400 to 2.483 GHz

Antenna Gain:

Typ. 6dBi

Time synchronization offset:

Typ. <5 μs

Expected product lifetime:

>5 years

ACCESSORIES

Cables:

Ethernet RJ45-NEUTRIK EtherCON CAT6a 10m
Ethernet RJ45-NEUTRIK EtherCON CAT6a 30m
Ethernet RJ45-NEUTRIK EtherCON CAT6a 60m

Mounting:

Sensor bridge side

4 hole 2" x 1,7" square base (included)

Extension arm

3” arm (included)

Rail side

Hose Clamp Base (1-2.1”) (included)
Tough-Claw™ Large Clamp Base (1-2.2”) (additional)

TESTING STANDARDS & COMPLIANCE

SB1 (10083) has successfully met all following international standards.

Environmental Testing

IEC 60068-2-1 / IEC 60068-2-2 – Verified the product's ability to withstand extreme temperatures:

- **IEC 60068-2-1**: Cold test to confirm functionality at low temperatures.
- **IEC 60068-2-2**: Dry heat test to ensure performance in high-temperature environments.

Corrosion Resistance

ISO 21207:2015 – Simulated harsh environmental conditions through cyclic corrosion tests, evaluating long-term durability.

Humidity & Temperature Cycling

IEC 60068-2-30 – Exposed the product to alternating high humidity and temperature variations to assess reliability in humid conditions.

Ingress Protection (IP) Ratings

IEC 60529 – IP65 – Evaluated the product's resistance to dust and water:

- **IP65**: Protection against dust ingress and low-pressure water jets.

CONTACT

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