

DECENTLAB

DL-IAM LOW POWER MODES

VERSION 1.5.1

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## INTRODUCTION

The device DL-IAM is optimized for low power consumption in order to enable a long battery life. In the standard configuration, the following sensors are active:

- Battery voltage
- Air temperature and humidity sensor
- Barometric pressure sensor
- Light sensor
- CO<sub>2</sub> sensor
- Motion sensor (PIR)
- VOC sensor

The individual sensors are sampled at regular intervals, most of them every 30 seconds. The VOC sensor is particular because it has to be sampled with a period of 30 seconds exactly. Otherwise, the VOC measurement does not meet the accuracy specifications given by the sensor manufacturer and the VOC data are not valid. Therefore, the default sampling period of most sensors of the device is 30 seconds, as shown in the following table.

SENSOR INDEX I	SENSOR TYPE	SENSOR_PERIOD	SENSOR SAMPLING PERIOD (WITH PERIOD = 30 S)
0	Battery voltage	1	30 s
1	Temperature / humidity	1	30 s
2	Barometric pressure	1	30 s
3	Light	1	30 s
4	CO <sub>2</sub>	4	120 s
5	Motion (PIR)	1	30 s
6	VOC	1	30 s (must be 30 s for valid VOC data)

The main sampling period of the device is configurable with the user-interface command "set period". The sub-sampling periods of individual sensors are also configurable: "set sensor\_period <i>", where i is the sensor index. Finally, the data transmission period is configurable by the command "set send\_period".

## POWER CONSUMPTION

Regarding the power consumption, the sensor types are very different. Most sensors consume very little power, while the VOC and CO<sub>2</sub> sensors consume considerable amounts of energy at the moment when they are sampled.

Even more power is consumed by the wireless data transmission. The more often data is transmitted, the more power is consumed, and the longer a transmission takes, the more power is consumed.

## HOW TO REDUCE POWER CONSUMPTION

With the goal to save power and increase the battery life, different strategies are possible. Some are more effective than the others, and all have an impact on the device operation. It very much depends on the application which strategies can be implemented and which are not applicable. In our opinion, the default settings of the device provide the best compromise for generic applications.

A collection of strategies to save power, sorted for descending impact:

- Increase the send period: transmit as little as possible.
- Disable the VOC sensor, if the application allows it.
- Improve the LoRaWAN radio link, so that the device uses lower spreading factors.
- Limit the LoRaWAN spreading factor: e.g. allow only SF7...SF10.
- Increase the sampling period of the CO<sub>2</sub> sensor, or disable it.

## LOW POWER MODES

Some of these strategies can be realized using downlink commands.

No.	Notes	period [s]	send_period	sensor_period						
				0 BAT	1 T/H	2 BARO	3 LIGHT	4 CO2	5 PIR	6 VOC
0	Default Send every 600 s = 10 min 20 x oversampling	30	20	1	1	1	1	4	1	1
1	VOC off Send every 600 s = 10 min 20 x oversampling	30	20	1	1	1	1	4	1	0
2	VOC off Send every 600 s = 10 min No oversampling	600	1	1	1	1	1	1	1	0
3	VOC off Send every 900 s = 15 min 2 x oversampling	450	2	1	1	1	1	1	1	0
4	VOC off Send every 3600 s = 1 hour 6 x oversampling	600	6	1	1	1	1	1	1	0
5	VOC off CO <sub>2</sub> off Send every 3600 s = 1 hour 6 x oversampling	600	6	1	1	1	1	0	1	0

Fields in light grey: non-default values.

# BATTERY LIFETIME

Low power mode	Estimated battery lifetime for EU868 [years]		
	SF7	SF10	SF12
0 (default)	1.4	1.2	0.9
1	2.5	2.0	1.2
2	3.9	2.7	1.4
3	4.3	3.2	1.9
4	5.6	5.1	3.9
5	6.6	5.8	4.4

## DISCLAIMER

Specifications and information in this document are subject to change without notice.

Decentlab products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.

## CONTACT INFORMATION

[www.decentlab.com/contact](http://www.decentlab.com/contact)

[mail@decentlab.com](mailto:mail@decentlab.com)

+41 44 809 35 90

Decentlab GmbH  
Kriesbachstrasse 30  
8600 Dübendorf  
Switzerland