Sleep

Sleep period is a nearly continuous, longish period of time spent lying down in bed. For each sleep period it detects, SENSOR 1 performs sleep analysis and stores a set of measurement parameters that summarize the period. The SENSOR 1 calculates the sleep period specific parameters within four hours from the period end, but sleep analysis is always triggered when you open the application.

Example data


```
{
  "summary_date": "2017-11-05",
  "period_id": 0,
  "is_longest": 1,
  "timezone": 120,
  "bedtime_start": "2017-11-06T02:13:19+02:00",
  "bedtime_end": "2017-11-06T08:12:19+02:00",
  "score": 70,
  "score_total": 57,
  "score_disturbances": 83,
  "score_efficiency": 99,
  "score_latency": 88,
  "score_rem": 97,
   "score_deep": 59,
  "score_alignment": 31,
  "total": 20310,
  "duration": 21540,
  "awake": 1230,
  "light": 10260,
  "rem": 7140,
  "deep": 2910,
  "onset_latency": 480,
  "restless": 39,
  "efficiency": 94,
```

```
  "midpoint_time": 11010,
  "hr_lowest": 49,
  "hr_average": 56.375,
  "rmssd": 54
  "breath_average": 13,
  "temperature_delta": -0.06,
  "hypnogram_5min": "443432222211222333321112222222222111133333322221112233333333332232222334",
  "hr_5min": [0, 53, 51, 0, 50, 50, 49, 49, 50, 50, 51, 52, 52, 51, 53, 58, 60, 60, 59, 58, 58, 58, 58, 55, 55, 55, 55, 56, 56, 55, 53, 53, 53, 53, 53, 53, 57, 58, 60, 60, 59, 57, 59, 58, 56, 56, 56, 56, 55, 55, 56, 56, 57, 58, 55, 56, 57, 60, 58, 58, 59, 57, 54, 54, 53, 52, 52, 55, 53, 54, 56, 0],
  "rmssd_5min": [0, 0, 62, 0, 75, 52, 56, 56, 64, 57, 55, 78, 77, 83, 70, 35, 21, 25, 49, 44, 48, 48, 62, 69, 66, 64, 79, 59, 67, 66, 70, 63, 53, 57, 53, 57, 38, 26, 18, 24, 30, 35, 36, 46, 53, 59, 50, 50, 53, 53, 57, 52, 41, 37, 49, 47, 48, 35, 32, 34, 52, 57, 62, 57, 70, 81, 81, 65, 69, 72, 64, 0]
}
```


Fields

sleep.summary_date

- Type: String
- Format: YYYY-MM-DD

Date when the sleep period ended.

sleep.period_id

- Type: Int

Index of the sleep period among sleep periods with the same summary_date, where 0 = first sleep period of the day.

sleep.timezone

- Type: Int
- Unit: Minutes

Timezone offset from UTC as minutes. For example, EEST (Eastern European Summer Time, +3h) is 180. PST (Pacific Standard Time, -8h) is -480. Note that timezone information is also available in the datetime values themselves, see for example.bedtime_start

sleep.bedtime_start

- Type: String
- Format: Date time

Local time when the sleep period started

sleep.bedtime_end

- Type: String
- Format: Date time

Local time when the sleep period ended.

sleep.duration

- Type: Int
- Unit: seconds

Total duration of the sleep period (sleep.duration = sleep.bedtime_end - sleep.bedtime_start).

sleep.total

- Type: Int
- Unit: seconds

Total amount of sleep registered during the sleep period (sleep.total = sleep.rem + sleep.light + sleep.deep).

sleep.awake

- Type: Int
- Unit: seconds

Total amount of awake time registered during the sleep period.

sleep.rem

- Type: Int
- Unit: seconds

Total amount of REM sleep registered during the sleep period.

sleep.light

- Type: Int
- Unit: seconds

Total amount of light (N1 or N2) sleep registered during the sleep period.

sleep.deep

- Type: Int
- Unit: seconds

Total amount of deep (N3) sleep registered during the sleep period.

sleep.hr_lowest

- Type: Int
- Unit: beats per minute

The lowest heart rate (5 minutes sliding average) registered during the sleep period.

sleep.hr_average

- Type: Int
- Unit: beats per minute

The average heart rate registered during the sleep period.

sleep.hr_5min

- Type: Array of integers
- Unit: beats per minute

Average heart rate for each beginning 5 minutes of the sleep period, the first period starting from sleep.bedtime_start.

sleep.efficiency

- Type: Int
- Range: 0-100%

Sleep efficiency is the percentage of the sleep period spent asleep (100% * sleep.total / sleep.duration).

sleep.onset_latency

- Type: Int
- Unit: seconds

Detected latency from bedtime_start to the beginning of the first five minutes of persistent sleep.

sleep.midpoint_time

- Type: Int
- Unit: seconds

The time in seconds from the start of sleep to the midpoint of sleep. The midpoint ignores awake periods.

sleep.restless

- Type: Integer
- Unit: %

Restlessness of the sleep time, i.e. percentage of sleep time when the user was moving.

sleep.temperature_delta

- Type: Float
- Unit: Celsius

Skin temperature deviation from the long-term temperature average.

sleep.breath_average

- Type: Float

- Unit: breaths per minute

Average respiratory rate.

sleep.score

- Type: Int
- Range: 1-100, or 0 if not available.

Sleep score represents overall sleep quality during the sleep period. It is calculated as a weighted average of sleep score contributors that represent one aspect of sleep quality each. The sleep score contributor values are also available as separate parameters.

sleep.score_total

- Type: Int
- Range: 1-100, or 0 if not available.

Represents total sleep time's (see sleep.total) contribution for sleep quality. The value depends on age of the user - the younger, the more sleep is needed for good score. The weight of sleep.score_total in sleep score calculation is 0.35.

sleep.score_rem

- Type: Int
- Range: 1-100, or 0 if not available.

Represents REM sleep time's (see sleep.rem) contribution for sleep quality. The value depends on age of the user - the younger, the more sleep REM is needed for good score. The weight of sleep.score_rem in sleep score calculation is 0.10.

sleep.score_deep

- Type: Int
- Range: 1-100, or 0 if not available.

Represents deep (N3) sleep time's (see sleep.deep) contribution for sleep quality. The value depends on age of the user - the younger, the more sleep is needed for good score. The weight of sleep.score_deep in sleep score calculation is 0.10.

sleep.score_efficiency

- Type: Int
- Range: 1-100, or 0 if not available.

Represents sleep efficiency's (see sleep.efficiency) contribution for sleep quality. The higher efficiency, the higher score. The weight of sleep.score_efficiency in sleep score calculation is 0.10.

sleep.score_latency

- Type: Int
- Range: 1-100, or 0 if not available.

Represents sleep onset latency's (see sleep.onset_latency) contribution for sleep quality. A latency of about 15 minutes gives best score. Latency longer than that many indicate problems falling asleep, whereas a very short latency may be a sign of sleep debt. The weight of sleep.score_latency in sleep score calculation is 0.10.

sleep.score_disturbances

- Type: Int
- Range: 1-100, or 0 if not available.

Represents sleep disturbances' contribution for sleep quality. Three separate measurements are used to calculate this contributor value:

1. Wake-up count - the more wake-ups, the lower the score.
2. Got-up count - the more got-ups, the lower the score.
3. Restless sleep (sleep.restless) - the more motion detected during sleep, the lower the score.

Each of these three values has weight 0.05 in sleep score calculation, giving sleep.score_disturbances total weight of 0.15.

sleep.score_alignment

- Type: Int
- Range: 1-100, or 0 if not available.

Represents circadian alignment's contribution for sleep score. Sleep midpoint time (sleep.midpoint_time) between 12PM and 3AM gives highest score. The more the midpoint time deviates from that range, the lower the score. The weigh of sleep.score_alignment in sleep score calculation is 0.10.

sleep.hypnogram_5min

- Type: String

A string that contains one character for each starting five minutes of the sleep period, so that the first period starts from sleep.bedtime.start: - '1' = deep (N3) sleep - '2' = light (N1 or N2) sleep - '3' = REM sleep - '4' = awake

sleep.rmssd

- Type: Int
- Unit: milliseconds

The average HRV calculated with rMSSD method.

sleep.rmssd_5min

- Type: Array of integers
- Unit: beats per minute

The average HRV (calculated using rMSSD method) for each beginning 5 minutes of the sleep period, the first period starting from sleep.bedtime_start.