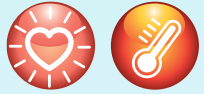


# Small implantable loggers for biomedical research

TEMPERATURE AND  
HEART RATE LOGGERS



## ADVANTAGES AT A GLANCE

- Small, leadless loggers
- Data stored in memory
- Automatic measurements
- Simple and cost-effective
- Group, unconfined housing

**STAR : ODDI**

Logging Life Science

[www.star-oddi.com](http://www.star-oddi.com)

Star-Oddi is a leading manufacturer of biomedical research equipment, specializing in the design of temperature and heart rate sensors that are miniaturized, reliable and practical.

The Star-Oddi data loggers are ideal for studies where integrity and repeatability of the study is important.

Using a logger eliminates all caging restrictions and reduces start-up and labor costs.

#### IDEAL LOGGERS FOR BIOMEDICAL STUDIES

The Star-Oddi loggers are small implantable recorders that measure heart rate and/or temperature with high accuracy and store real-time data in their internal memory, accessible after the trial. For several years the Star-Oddi loggers have been used by the biomedical industry in virology, vaccinology and in studies that require accurate measurements. All DSTs are delivered with calibration certificates to ensure compliance with GLP.

#### HEART RATE MEASUREMENTS

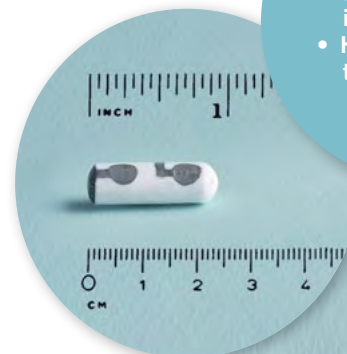
The DST-HRT loggers simultaneously measure long term heart rate and core temperature. This makes them ideal for studies in which baseline and immunology responses are recorded; they are also suitable for toxicological, metabolic and thermoregulation studies. The heart rate is derived from a leadless single channel ECG in which the electrodes are part of the housing material, making the logger especially easy to implant. The logger then takes a burst measurement on any set time interval and calculates the mean heart rate for each recording. For validation purposes, each individual burst is graded with a certain quality index (QI) accessible in the accompanying application software.

#### TEMPERATURE MEASUREMENTS

The DST temperature loggers are well suited for recording constant temperature throughout your research with no disturbance to the animal or the subject. Being able to measure core temperature without human interference reduces the stress placed on the animal circumventing any consequential fluctuations in the temperature profile. This may also result in a reduction of the number of laboratory animals used, with fewer animals needed to obtain reliable temperature data.

#### DST-HRT

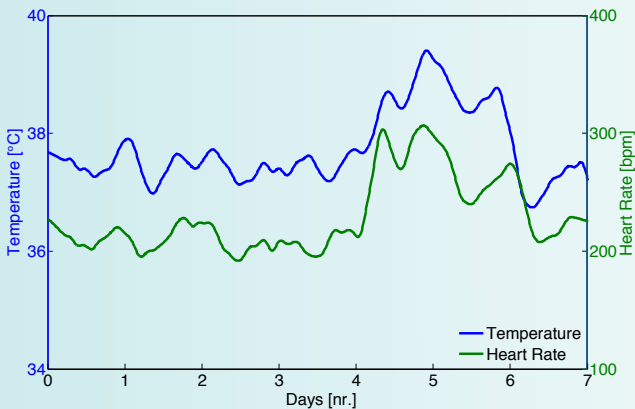
- available in two sizes
- Heart rate and temperature



#### SMALL SIZED LOGGERS

The DST product family features four different sizes: centi, milli, micro and nano. The DST loggers vary in size, memory size & battery life.





Temperature and heart rate correlation, as shown in the application software

### COMPACT LEADLESS DESIGN

Researchers appreciate the loggers small size, high accuracy and biocompatible material suitable for implantation. With the completely leadless design of the loggers the implantation surgery becomes minimally invasive.

### EASY TO USE AND REUSABLE

The Star-Oddi loggers are simple in use, from setup and surgery to data retrieval. The measurement data can be analyzed in graphic and tabular form and exported to most statistical analysis programs. The same logger can be reused as long as the battery lasts. When data has been retrieved the logger can easily be sterilized and reset for new recordings. We recommend using gas or ethanol sterilization for our loggers.

### COMMITMENT TO THE 3Rs

The 3Rs ethical framework is implemented by Star-Oddi in its DST biomedical loggers series. Being able to measure core body temperature without human interference reduces the stress placed on the animal avoiding consequential fluctuations in the temperature profile. This can reduce the number of laboratory animals used, with fewer animals needed to get reliable temperature data. The DST-HRT is the only leadless heart rate monitor on the market which minimizes wound pain and trauma of implantation for the animal.

**Scientific publications using using Star-Oddi's loggers are available at:**  
[www.star-oddi.com/biomedical/publications](http://www.star-oddi.com/biomedical/publications)

## DST loggers specifications

	DST nano-T	DST micro-T	DST milli-T	DST centi-T	DST micro-HRT	DST milli-HRT
<b>Sensors</b>	Temperature	Temperature	Temperature	Temperature	Temperature, heart rate	Temperature, heart rate
<b>Size: diameter x length</b>	6mm x 17mm	8.3mm x 25.4mm	13mm x 39.4mm	15mm x 46mm	8.3mm x 25.4mm	13mm x 39.4mm
<b>Weight (in air/in water)</b>	1g	3.3g	9.2g	19g	3.3g	11.8g
<b>Battery life</b>	14 months*	28 months*	5 years*	9 years*	4 months*	10 months*
<b>Memory type</b>	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM
<b>Memory capacity</b>	43476 measurements	43476 measurements	87000 measurements	174000 measurements	43688 measurements	43688 measurements
<b>Data resolution</b>	12 bits	12 bits	12 bits	12 bits	12 bits	12 bits
<b>Min. measuring interval</b>	1 sec	1 sec	1 sec	1 sec	1 min	1 min
<b>Temperature range</b>	5°C to 45°C (32°F to 113°F)	5°C to 45°C (32°F to 113°F)	5°C to 45°C (32°F to 113°F)	5°C to 45°C (32°F to 113°F)	5°C to 45°C (32°F to 113°F)	5°C to 45°C (32°F to 113°F)
<b>Temperature resolution</b>	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)
<b>Temperature accuracy</b>	+/- 0.2 °C (+/- 0.36°F)	+/- 0.2 °C (+/- 0.36°F)	+/-0.1°C (0.18°F)	+/-0.1°C (0.18°F)	+/- 0.2 °C (+/- 0.36°F)	+/- 0.2 °C (+/- 0.36°F)
<b>Temperature response time</b>	Time constant (63%) reached in 8 sec.	Time constant (63%) reached in 10 sec.	Time constant (63%) reached in 12 sec.	Time constant (63%) reached in 20 sec.	Time constant (63%) reached in 20 sec.	Time constant (63%) reached in 20 sec.
<b>HR sampling freq</b>					100-800hz	100-800hz

\* For a sampling interval of 10 min.  
Specifications are subject to change without notice.

## PERSONAL SERVICE

Customers are Star-Oddi's best advisors. We are always looking for new ideas and ways to improve our products. Please contact us if you have any suggestions for us.

## STAR-ODDI LTD.

Founded in Iceland in 1985, Star-Oddi has become recognized as one of the world's leading manufacturers of technology for research and industrial use.

Since 1993, Star-Oddi has been manufacturing the Data Storage Tag, a miniature data logger.

Star-Oddi operates in the global marketplace. Star-Oddi's mission is to offer excellent quality, reliability and well designed, unique products.



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