

Ultra small implantable loggers

TEMPERATURE AND
HEART RATE



ADVANTAGES AT A GLANCE

- Leadless, minimally invasive
- Safe to implant
- Automatic stress-free measurements
- Logs in memory, telemetry available
- Reusable

STAR : ODDI

Logging Life Science

www.star-oddi.com

We have over 20 years experience making small, reliable data loggers for all types of wildlife and laboratory animals and pharmaceutical production.

Using an implantable logger improves the number and quality of data significantly, enabling thousands of automatic measurements stress free.

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.

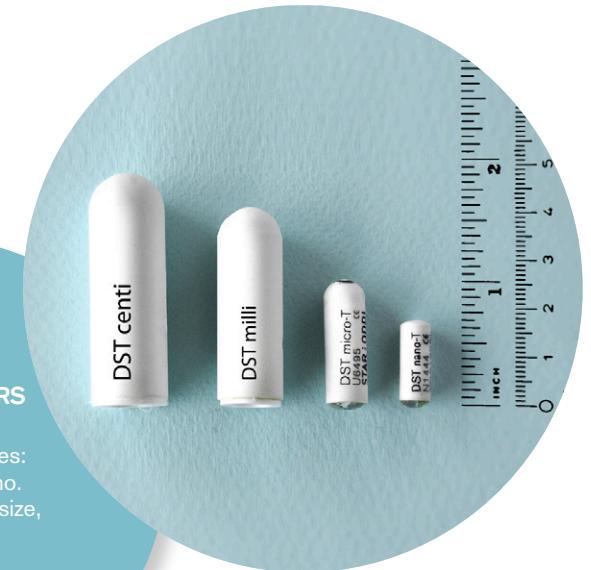
TEMPERATURE MEASUREMENTS

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.



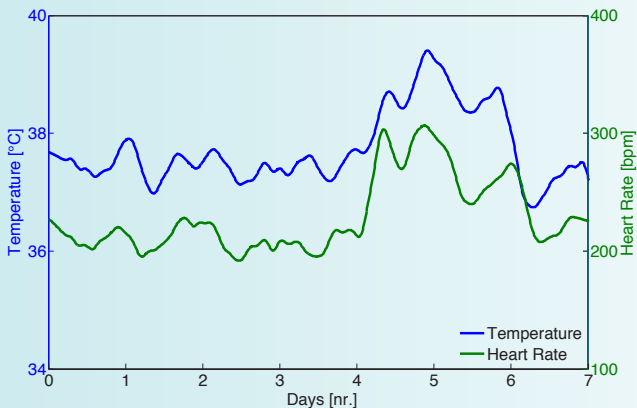
HEART RATE AND TEMPERATURE LOGGER

No wiring - electrodes are part of the housing



SMALL SIZED LOGGERS

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

DST loggers specifications

	TEMPERATURE				HEART RATE		
	DST nano-T	DST micro-T	DST milli-T	DST centi-T	DST micro-HRT	DST milli-HRT	DST centi-HRT
Sensors	Temperature	Temperature	Temperature	Temperature	Temperature, heart rate	Temperature, heart rate	Temperature, heart rate
Size: diameter x length	6mm x 17mm	8.3mm x 25.4mm	13mm x 39.4mm	15mm x 46mm	8.3mm x 25.4mm	13mm x 39.4mm	15mm x 46mm
Weight (in air/in water)	1g	3.3g	9.2g	19g	3.3g	11.8g	19g
Battery life	14 months*	28 months*	5 years*	9 years*	3.5 months**	8.5 months**	19 months**
Memory type	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	FLASH	FLASH
Memory capacity per sensor	43,476 measurements	43476 measurements	87,000 or 1.4 million measurements	174,000 measurements	43,688 measurements	699,000 measurements	699,000 measurements
Data resolution	12 bits	12 bits	12 bits	12 bits	12 bits	12 bits	12 bits
Minimum measuring interval	1 sec	1 sec	1 sec	1 sec	15 sec.	1 min	1 min
Temperature range	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)	5°C to 45°C (32°F to 113°F)
Temperature resolution	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)	0.032°C (0.058°F)
Temperature accuracy	+/- 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)	+/- 0.2 °C (+/- 0.36°F)
Temperature response time	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 10 sec.	Time constant (63%) reached in 12 sec.	Time constant (63%) reached in 20 sec.
HR sampling freq					100-800hz	100-800hz	100-800hz

*Temperature loggers - For a sampling interval of 10 min.

**Heart rate loggers - For a sampling interval of 10 min at fs=600 Hz. Battery life of heart rate loggers is subject to change based on sampling frequency.

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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