

DISCLAIMER

Except as specified below, Kaha Sciences makes no warranties, express or implied, and specifically disclaims any warranty of the products fitness for a particular purpose.

The customer's right to recover damages by fault or negligence of Kaha are limited to the amount paid by the customer for the Kaha product. Any action against Kaha must be brought within one year after the cause of action occurs. Kaha will not be held liable for any loss of data, research funding or profits and neither will it be liable for incidental or consequential damages even if advised of the possibility thereof.

Kaha expresses that its products are for research purposes only and that the telemetry products are designed for use by professionals with appropriate education and training in life science and medical research applications. They are not designed with components and testing intended for use in medical treatment or diagnosis of humans or animals and doing so may result in serious harm.

WARRANTY

Rat Telemeter Warranty

Kaha's comprehensive telemeter warranty guarantees that telemeters will function out-of-box for the first six months after factory shipment. Additionally, Kaha provides a sixty (60) day in-animal telemeter warranty within the six (6) month warranty period. Any telemeter not registered within six months after factory shipment will be out of warranty.

Kaha requires all new rat telemeters to be registered upon the first implantation. To register the telemeter's in-animal warranty, simply send an email to support@kahasciences.com and include the following:

- Telemeter Model and Serial Number
- Facility Name
- Primary Investigator / Laboratory Head name and phone/email
- Primary lab contact name and phone/email
- Implantation Date

Multiple telemeters can be activated with a single email. For complete telemeter handling and storage instructions, refer to the User manual or register to access our online knowledge center.

Mouse Telemeter Warranty

Kaha warrants that at the time of sale and shipment to the original Purchaser, Kaha mouse telemeters shall be free from defects in material and workmanship for 90 days from the date of shipment. If there is a defect in material or workmanship, Kaha will, at no charge, replace the equipment as appropriate.

Telemetry Hardware Warranty

Kaha warrants that at the time of sale to the original Purchaser, the telemetry hardware (excluding telemeters – see above) shall be free from defects in materials and workmanship for a period of one (1) year from its date of shipment to the original purchaser. If there is a defect in material or workmanship, Kaha will, at no charge and at its option, either repair or replace the equipment as appropriate.

Should the hardware become damaged after expiration of the one-year warranty, Kaha will accept the product for evaluation with a signed RMA (return material authorization) and at a cost of USD100. If repairs are required, Kaha will provide a detailed quote and lead time with repair work not commencing until approval is received from the customer.

As part of Kaha's continued commitment to customer support, free online, phone and email support in the use of all telemetry equipment is available beyond all warranty periods.

The warranties above do not cover damage caused by failure to follow instructions for use, owner's abuse, misuse or negligence, user tampering or modifications, power failures or surges and events or accidents considered force majeure such as flooding, fire, etc. outside the reasonable control of Kaha. In no case shall liability exceed the purchase price of the original product.

Kaha provides free product evaluations during the warranty period and free return to customer shipment. All returned products should be packed safely, preferably in original packaging, and shipped to Kaha with a Kaha RMA number visible on the packaging and with all RMA documentation. In order to receive the highest level of support, the customer is responsible for notifying Kaha immediately of a problem within the warranty period. Following product evaluation, Kaha will replace or repair (excluding telemeters which are non-repairable) any product found to be defective and covered within the warranty period, while operated in accordance with instructions for use and specifications.

CONTACT INFORMATION

Kaha is proud to offer unlimited technical support and advice to all its customers. Our team of engineers and physiologists are available to advise on specific applications and appropriate equipment configurations.

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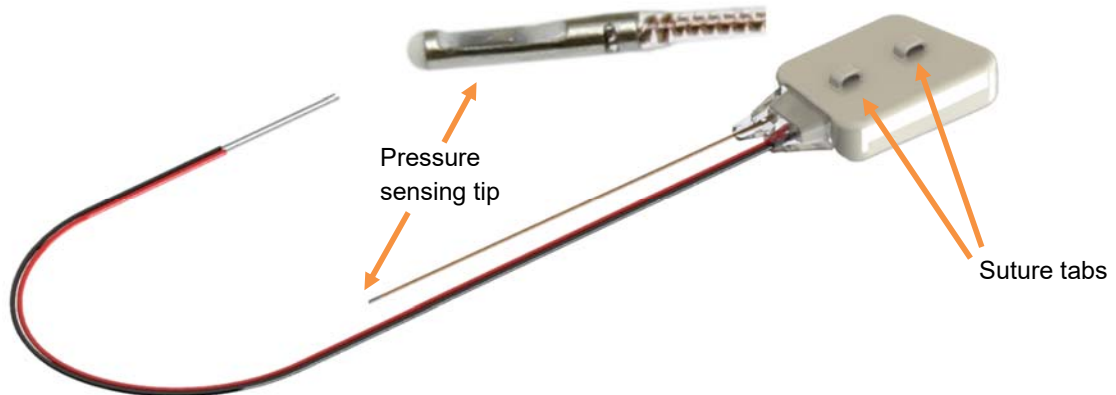
Email: support@kahasciences.com or sales@kahasciences.com
WEB: www.kahasciences.com

Rat Telemeter Instructions for Use

Please read these instructions carefully before using your telemeter. We also strongly recommend reading the User Manual for Kaha Sciences Rat Telemetry Systems and viewing our Online Resources which contain videos on surgical techniques as well as care and cleaning of the telemeters. <http://kahasciences.com/knowledge-centre>

THE TELEMETER

Depending on the model, your telemeter may look slightly different to the one below with differing sensors but all have the same basic configuration and operation.



Important! All telemeters are shipped on Channel “Setup” and switched off (Safe Mode) to maintain battery life. They must be activated and configured to a channel (1-40) before first use. Channel “Setup” should NOT be used for data collection. Please read the User Manual or visit the Kaha website Knowledge Centre for details on activation and configuration of the telemeter.

Important! For best charging performance, the telemeter must be implanted within the abdominal cavity and parallel to the SmartPad surface. Securing the telemeter to the abdominal wall using the suture tabs places it in the best position for recharging and signal communication. Further information and support such as surgical videos are available online at <http://kahasciences.com/knowledge-centre>

CARE AND HANDLING

- **Take care not to damage the telemeter body, pressure catheter or electrodes as they are non-repairable.**
- **If handling the pressure catheter using forceps, please ensure the forceps tips are padded using soft tubing (e.g. silicon). This will protect the wires inside the catheter from being crushed.**

Telemeter Storage/Battery Charge

Telemeters with pressure catheters are shipped with foam protecting the sensor tip. Between uses, the telemeter should be stored in the original packaging with the sensor tip protected using the foam. The telemeter should be fully charged before it is placed in Safe Mode for storage. **IMPORTANT** If storing telemeters for more than 3 months they need to be turned on after this time and checked. If not fully charged (90-100%), place the telemeter on the SmartPad and recharge before returning to Safe Mode and storing. Telemeters in Safe Mode must be kept at least 1m from any SmartPad to prevent them from turning back on.

Care & Handling: Pressure Sensor Catheter

- Inspect the catheter and/or leads for damage (cracking, kinks, etc.) before and after each use.
- Clean the telemeter and catheter immediately after each use (see Cleaning section in this document).
- Do not touch the pressure sensor area with sharp objects. Do not make sharp bends in the catheter.
- **Do not apply direct pressure to the sensor area with instruments such as forceps or tweezers.**
- When handling the catheter always handle the catheter 5-10 mm proximal to the sensor area. The sensor area contains very fine wires which may be damaged or broken if the catheter is gripped too close to the sensor or too tightly, be GENTLE.
- Always know the location of the catheter tip.
- Do not place heavy objects or metal instruments on top of the catheter or telemeter.
- Take care not to cut the catheter during surgery or when removing the telemeter from the animal.

Telemeter Care & Handling Summary

	DO:	DO NOT:
Pressure Sensor	Clean immediately after use	Do NOT clean with stiff-bristled brush Do NOT clean with high pressure water jet
	Protect sensor tip when not in use	Do NOT tap the sensor against a hard surface
		Do NOT apply excessive force to the sensor tip
		Do NOT expose to excessive pressure
Catheter	Clean immediately after use	Do NOT cut, crease, knot, fold, kink, or crush with forceps or clamps of any kind
Cleaning	Keep catheter and sensor wet until cleaned	Do NOT expose to alcohol, cresols, phenols, mercury compounds, hypochlorites, acetone, peroxide, silicone chlorine, xylenes, surfactants, trichloroethylene, or freon
	Clean thoroughly with approved enzymatic cleanser immediately	Do NOT use an ultrasonic cleaner
Disinfection or Sterilization	Dry catheter before sterilizing with ethylene oxide	Do NOT autoclave, irradiate (gamma/ebeam), plasma, peroxide or formaldehyde vapor solutions
	Use a recommended cleaning agent	Do NOT use Sporox or Cidex PA solutions

Cleaning

****NOTE: If wanting to use an enzymatic cleaning, disinfectant or sterilization option that is not recommended below please contact Kaha support (support@kahasciences.com) before using it to confirm that it will not cause telemeter damage.** Visit the online knowledge center (<http://kahasciences.com/knowledge-centre>) for instructional videos on cleaning and care of the telemeters.

1. After removing the telemeter from the animal, immediately soak in a beaker or dish with fresh saline or distilled water. Keep soaking until you are ready to continue cleaning; DO NOT allow it to dry.
2. Soak in a recommended enzymatic detergent cleaning solution (listed below). This is essential to prevent protein build-up on the pressure sensor. Without the use of an enzymatic cleaner, a protein film will form that can result in pressure signal drift.

Type	Trade Name	Manufacturer	Active Ingredient	Soak Time / Temp
Enzymatic Detergent	Enzol [®] (in UK: Cidezime [®])	Advanced Sterilization Products (J&J)	Propylene Glycol	15 mins / room temp
	Endozine [®]	Ruhoff Corporation	Propylene Glycol	15 mins / room temp
	Terg-A-Zyme [®]	Alconox	Sodium Dodecylbenzene	15 mins / room temp

3. After soaking (recommended times), gently wipe the sensing tip under a microscope with a soft cotton gauze pad or swab sticks to remove any remaining film or deposits. To prevent any damage care must be taken not to place any pressure on the sensing tip.
4. After soaking and wiping, completely rinse the telemeter at least 3 times with fresh distilled water or saline.
5. After rinsing, gently dry the catheter using the following steps:
 1. Fold a soft tissue or Kim wipe.
 2. Use gentle stroking to dry the catheter tip.
 3. **Do not** pull the catheter tip through a folded tissue.
 4. **Do not** allow the catheter to air dry on the tray, table, or countertop.
6. After the cleaning procedure is finished:
 - Protect the sensor area on the catheter tip by carefully placing it in the foam that came with the telemeter.
 - Return the telemeter to the supplied storage tray.
 - Slide the tray inside the box and store the telemeter in a cool, dry place until the next use.

IMPORTANT: Delays in rinsing will reduce cleaning effectiveness! Examine the pressure sensor active surface (diaphragm) for blood or materials not removed by cleaning. A dirty sensor may cause baseline drift.

Surgical Implantation Preparation: Disinfection/Sterilization

CAUTION: DO NOT sterilize by autoclaving, radiation (gamma or e-beam), plasma, peroxide or formaldehyde vapour solutions.

1. The telemeter must be cleaned, rinsed and dried before disinfection or sterilization. Soil, debris, proteins, and water can interfere with the effectiveness of the following procedure. **Note** that some disinfectants have a limited usable life after activation or opening the container, failure to take notice of the warnings can prevent the effectiveness of the disinfection process.
2. Prepare the disinfectant according to the manufacturer's instructions.
3. Soak the telemeter in the disinfectant at the temperature and time intervals listed.
4. Rinse the telemeter well in sterile pyrogen-free water (or sterile saline) before implantation. A minimum of three separate rinses is recommended. Do not reuse any of the water used for rinsing since it will be contaminated with the disinfectant.

IMPORTANT: Use only the listed recommended cleaners and disinfectants for the times/temperatures indicated.

NOTE: All telemeters (excluding the Tissue Oxygen telemeter) may be sterilized using Ethylene Oxide. More information is available online at <http://kahasciences.com/knowledge-centre>

Type	Trade Name	Manufacturer	Active Ingredient	Soak Time / Temp
High-level disinfectant	Cidex Activated Dialdehyde Solution	Advanced Sterilization Products (J&J)	Gluteraldehyde	1-2 hours / 25°C (77°F)
	Cidex [®] OPA	Advanced Sterilization Products (J&J)	Orthophthalaldehyde	16-30 mins / 20°C (68°F)
	MetriCide [®]	Metrex	Gluteraldehyde	1-2 hours / 25°C (77°F)

TELEMETER PRESSURE RECORDINGS IN THE ANIMAL

Telemeters are shipped sterile and dry, when implanted pressure values recorded in the first 48 hours after surgery may have an offset of up to 20 mmHg.

Before making any recordings from the implanted telemeter it is important that the telemeter has been turned on for a minimum of FOUR (4) hours.

CALIBRATION & OFFSET TESTING

During factory calibration, we attempt to ensure the environment is as similar as possible to what the telemeter will experience when implanted in an animal. Users who wish to follow or check the offset either pre or post implantation need to precisely set the environment for the offset test as detailed below. **Please Note:** Telemeters should remain immersed throughout the testing procedure.

Key factors that need to be controlled are;

1. **Hydration:** Telemeters should be soaked for a minimum of 48 hours prior to offset check. It is important to ensure that, when checking the offset, the sensor tip is no more than 5 mm under the water to avoid a head of pressure effect.
2. **Switch on time:** On the bench, all telemeters have a signal settling period when first switched on. To correctly account for this "switch-on effect", telemeters should be in active mode on a SmartPad for a minimum of FOUR (4) hours prior to checking the offset pressure.
3. **Telemeter Temperature:** Telemeters should be held at 38°C for a minimum of 30 min prior to recording values.
4. **Light:** Telemeters need to be in the dark.

If testing at the time of explant this process can be simplified:

1. The telemeter can be removed from the animal whilst still in active mode, put immediately in a Tergazyme solution and placed on the SmartPad.
2. Once cleaned, it can be placed in warm water (with <5mm fluid above the tip) at 38°C for 30 minutes in the dark. The output voltage obtained from the SmartPad at this zero pressure level should be close to 1.0 V.
3. Telemeters are all shipped factory calibrated using tightly controlled conditions as listed above.

Under these conditions the voltage output from the SmartPad outputs corresponds to the following values:

Pressure	Temperature	Biopotential	Oxygen	SNA
1V = 0 mmHg	0V = 0°C	0V = -2 mV	1V = 0 nA	0V = -60 µV
2V = 100 mmHg	1V = 20°C	2V = 0 mV	2V = -200 nA	2V = 0 µV
		4V = 2 mV		4V = 60 µV