

## RAT Sensor

### Purpose

AntTail's RAT (Rugged AntTail Tag) is a mechanically robust sensor and is typically used to monitor temperatures on pallets, in trucks or in warehouses. It is a multi-use sensor that can be used an unlimited number of times during its battery lifespan. The RAT monitors temperature in a preset interval of 5 minutes and continuously stores the temperature value together with a time stamp in its logging memory. The RAT memory can be read out wirelessly by AntTail gateway or AntTail smartphone app and all temperature data is automatically synchronized with the AntCloud, i.e. the AntTail cloud based back office. The RAT has an internal temperature sensor and will continuously record temperatures during its 8 year life time.



### Keywords

- Easy temperature monitoring and automatic wireless data collection.
- Once on, never off. Never miss a temperature sample
- More than 8 year memory. Never miss a temperature sample
- Rugged and robust with Gore-Tex membrane to prevent humidity issues.
- Wireless read out. View the information you need without wires, readers, pairing. No hassle for users.
- Automatic sensor data read out by AntTail Gateway or AntTail smartphone app (iOS and Android) via Bluetooth Low Energy (BLE) and direct storage in the AntCloud.
- Easy access to temperature data and settings via the customer portal by web browser or smartphone
- Alarm configuration and evaluation directly after each read out into the AntCloud. This allows that RATs can be used for any kind of alarm profile and can be flexibly configured.
- When exceptions occur, alarms and supporting data are sent automatically from the AntCloud to the responsible decision makers so they can take appropriate action
- Super quick catch-up scenario is built-in. Recover one month of data wirelessly in 35 seconds.
- Synchronizes sensor time to UTC-0 via secure and authenticated infrastructure
- Every transmission is encrypted and authenticated
- Refurbishment after 8 year battery lifetime is possible



### AntTail infrastructure

## Technical Specs

RAT Temperature sensing	
Temperature range	-30 °C to + 65 °C
Accuracy (Worst case)	± 0.5 °C
Accuracy (Typical)	< ± 0.3 °C
Temperature resolution	0.0625 °C
Response time (T90)	35 minutes (no airflow) 20 minutes (with airflow)
Drift	< 0.0625 °C during battery life time.
Data storage	> 8 Year memory Automatic storage with timestamp of all temperature samples and events in sensor memory after activation
Measurement interval	5 minutes
Factory calibration	The temperature sensing element is factory calibrated (laser trimmed) and the sensing element requires no extra calibration, external signal condition and extra adjustment/justification to achieve the RAT worst case accuracy of ±0.5°C. The sensing element of the RATs are 100% factory tested against NIST-traceable sensors.
Calibration certificates	An additional calibration certificate for each individual sensor can be purchased as extra option
Calibration interval	By design and confirmed by the accelerated life time tests, the RAT sensing element does not require adjustments to reach and maintain its sensing accuracy over its intended life time. Hence there is no need for recalibration of the RAT during its battery life time.

RAT Wireless communication	
Protocol	Bluetooth Low Energy (BLE) 4.1 compliant
BLE SIG declaration	Declaration ID D042820
BLE frequencies	2.4 Ghz ISM, 40 BLE channels & Adv channels
BLE max output power	< +4dBm
BLE range	> 25 meters (free Air)
Encryption and authentication	Every transmission is encrypted and authenticated by individual security key, unique for each sensor.
BLE Communication	Automatic connectivity. No manual pairing or bonding required as all AntTail sensors connect automatically to gateway's or AntTail apps. Automatic secure time synchronization to UTC-0 Automatic and live temperature data storage in AntCloud off all sensors near any AntTail gateway or AntTail app. Automatic history synchronization to AntCloud for missing data, i.e. temperature samples measured when the sensor was not in range of AntTail gateway or AntTail app. (typical 1 Month in 35 seconds)

RAT Battery	
Battery type	Lithium 3.6 Volt, 2 Cells, 5400 mAh, not rechargeable, non-replaceable
Battery life time	> 8 Year when operated above 0 °C. > 6 Year when operated above -30°C. 100 months typical use. Battery life time can vary depending on device age, use case and operation temperature. Battery life will be inherently diminished when sensors are operated for longer period below 0 °C.
Low battery indication	Battery status of RAT is visible in AntCloud.
Battery safety	UN38.3 UL 1642, Standard for Safety for lithium batteries IEC60086-4, primary batteries, safety of lithium batteries Battery pack has under voltage protection and cut off

RAT Operation	
Storage conditions	When not in use, the RAT should be stored in an environment with an ambient temperature between 15 °C and 30 °C
Activation	Each RAT will be active on delivery.
Operating conditions	Air and neutral gases -30 °C to + 65 °C
Transportation	The RAT can be shipped via air, ground, and ocean in accordance with UN 3091, Packing Instruction 970 Section II Up to 2 RAT's can be shipped without labeling per IATA's 2017 Dangerous Goods Regulations' 58th Edition
Maintenance	Please avoid any aggressive solvent Batteries cannot be recharged. Do not replace the batteries yourself
Refurbishment	AntTail has a refurbishment program in place. This includes battery replacement, memory clearance and new assembly acceptance test
Guarantee period	RAT sensors do have a 1 year guarantee for manufacturing defects. Return the RAT sensor to our AntTail office when service is required
End of life / recycling.	WEEE recycling instruction. The RAT product must not be disposed of with your other household waste. Waste Electrical and Electronic Equipment (WEEE) is potentially hazardous to human and environmental health. Re-use, recycling and recovery efforts are the responsibility of all consumers, producers and representatives dealing with Electrical and Electronic Equipment. For more information on proper recycling, please contact your local waste-management authority.

RAT General	
Product number	10.01.01
Sensor ID	8 hexadecimal numbers. Shown on label below barcode
Barcode	Sensor ID in code 128
Dimensions	(l) 93 mm x (w) 67 mm x (h) 27 mm
Weight	135 grams
Enclosure	IP 66
Emission certifications	RTCA DO-160G, Category H approved
European directives	CE, RoHS, WEEE, EMC
Compliance	21CFR Part 11, EN12.830, GAMP5

## Terms and conditions

User assumes responsibility for correct operation of the AntTail product and any software associated with it. User assumes responsibility for determining the suitability of the product to the user's needs, for configuring and using the product to meet those needs, and for the proper placement/location of the product in the environment it is being used. User assumes responsibility for verifying and interpreting results obtained from AntTail product use.

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## AntTail

AntTail designs, develops and delivers products and services to monitor and track the origin and temperature of medicines throughout the cold chain. AntTail cloud computing and SaaS based solutions help to ensure product quality and prevent counterfeiting. Pharmaceutical, transportation and logistics service providers, healthcare providers and retail outlets can follow shipments and deliveries, checking temperature every step of the way. AntTail works within existing cold chain quality procedures, eliminating the need for complex implementation and capital investments.