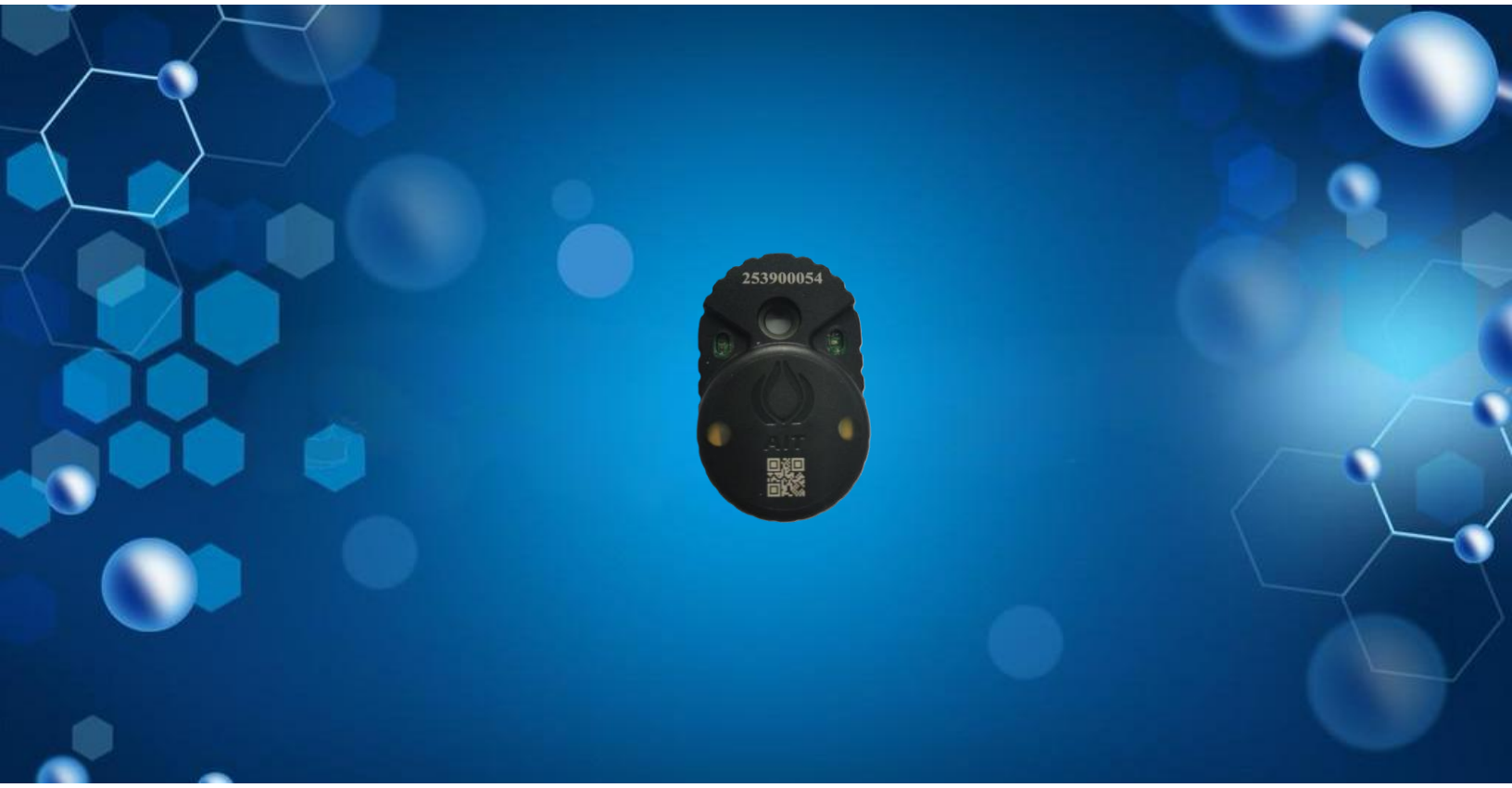

SOE200-Intelligent Health Tracking System for Pigs

HMS-DK-B2-07 Technical Manual

V1.0 | Dec 2025

SOE200-Intelligent Health Tracking System for Pigs

HMS-DK-B2-07

FEATURES

- **Precision Early Warning System:** Estrus detection accuracy: >90%. Farrowing alert: 6–12 hours in advance
- **Lightweight & Comfortable Design (EU Animal Standard Compliance):** Industrial-grade composite materials: Only 16g. Streamlined ergonomic shape: 47×30×10.5mm**.** Magnetic switch structure: Φ20×25mm
- **Long-Lasting Power Solution:** Maintenance-free use: >24 months**.** Wide temperature adaptability: -10°C~55°C

APPLICATIONS

- **Precision Breeding:** Capture the optimal conception window to shorten the non-productive period.
- **Farrowing Monitoring:** Establish electronic farrowing logs to reduce stillbirth rates.
- **Disease Prevention:** Create individual health profiles | Early warnings 48 hours before clinical symptoms appear.
- **Group Management:** Optimize pen layout using activity heatmaps.

DESCRIPTION

The SOE200 Intelligent Health Tracking System for Pigs ushers in a new era of smart breeding, reconstructing pig breeding management through cutting-edge IoT integration and proprietary data processing technology. This all-in-one IoT-powered solution digitizes the entire sow breeding cycle, resolving core industry pain points—such as missed estrus detection, delayed disease alerts, and farrowing-related losses—and unlocking data-driven efficiency for modern pig farms.

At the heart of the system lies the revolutionary smart ear tag, engineered with a suite of high-performance sensors and semiconductor components: multi-channel temperature sensors, a 3-axis motion sensor, a Hall sensor, BLE 5.X module, LED positioning indicator, and optional RFID functionality. Complemented by temperature and humidity monitoring at the Wi-Fi/Cellular gateway, the ear tag leverages AIT's proprietary **TempSync™ Edge Calibration Algorithm**—a breakthrough edge computing technology that harnesses the on-tag microprocessor to eliminate environmental interference and filter out short-term temperature fluctuations caused by pig ear flipping, ensuring medical-grade data accuracy. Beyond temperature calibration, this advanced algorithm interprets motion sensor data to precisely identify 7 key pig postures and behaviors, including standing, lying down, eating, kneeling, and walking—turning raw sensor data into actionable behavioral insights.

Data reliability is guaranteed by the ear tag's on-board storage, which retains edge-processed data for up to 4 days. Data is transmitted to the gateway at 30-minute intervals, and in the event of temporary Bluetooth disconnection, the ear tag automatically caches all data locally until reconnection is restored—ensuring zero loss of critical breeding or health data.

The system's gateway serves as a robust connectivity hub, establishing seamless communication with ear tags via Bluetooth 5.X. Equipped with dual Wi-Fi and Cellular capabilities, it securely transmits aggregated data to the cloud, supporting up to 150 concurrent ear tag connections and a maximum coverage distance of 100m (adjustable based on farm layout and environmental conditions).

Powering the system's predictive capabilities is the **PigInsight™ AI Analytics Engine**—our cloud-based intelligent platform that processes calibrated body temperature data and behavioral insights to deliver real-time

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early warnings for estrus and potential illness. To enhance usability, we offer a comprehensive farm management software integrated with a dedicated pig health module, alongside a user-friendly mobile app designed for on-site farm workers to access alerts, monitor herds, and operate the system with minimal training. Furthermore, recognizing the value of existing IT infrastructure for farms, we've built seamless integration capabilities: the system supports integration of its health module into customers' own farm management software via standard API interfaces and MQTT protocols. This non-intrusive integration significantly reduces implementation hurdles, allowing farms to leverage our intelligent monitoring capabilities without disrupting their current operational systems.

AIT Sensing has pioneered this end-to-end intelligent ecosystem—from sensor to cloud, with flexible integration options—to redefine precision in pig breeding. The Sow Demo Kit (HMS-DK-B2-07) is an intelligent breeding experience package, ideal for rapid system function validation for new customers, pilot programs for small-scale farms, and technical training demonstrations—inviting you to embrace the future of data-driven, seamlessly integrated pig farming.

Key Core Advantages

- **Revolutionary IoT Ear Tag:** Dual-mode monitoring (body temperature + behavior) enables full digital management of sow breeding cycles. Effectively resolves traditional farming challenges such as missed estrus detection, delayed disease alerts, and farrowing-related losses.
- **Core Value:** Boosts sows' average annual litter count by over 2.3 and significantly reduces farming mortality rates.
- **Proprietary TempSync™ Edge Calibration Algorithm:** Eliminates environmental interference and ear-flipping-induced temperature fluctuations; accurately identifies 7 key pig postures for deep behavioral insights.
- **Seamless Integration Capabilities:** Standard API interfaces + MQTT protocols support integration with customers' existing farm management software—no disruption to current IT infrastructure, lower implementation barriers.
- **Intelligent Operation & Maintenance System**
    - LED positioning tracking: Abnormal status indicator for quick pig location
    - Cloud platform: Supports real-time concurrent connections for multi-farm, full-herd management
    - Ultra-long transmission (100 m) + IP68 waterproof: Stable operation in extreme environments
- **Data-Driven Decision Making**
    - Multi-dimensional visual dashboards:
    - Body temperature fluctuation heatmap
    - Activity intensity trend analysis
    - Breeding cycle prediction curve
    - Group health index ranking

TECHNICAL PARAMETERS

Parameter	Specification	Comments
Body Temperature	Resolution: 0.1°C	Intelligent sampling: 1 sample/minute
Behavior Recognition	Multi-level activity quantification (walking, lying down, kneeling, standing, eating et al)	Sampling Frequency: 25 Hz
Early Warning	ΔTemp ≥ 0.5°C + ΔActivity ≥ 20%	Adjustable thresholds
Transmission Range	25–100 m	Depends on environment
Sensor Integration (Ear Tag)	Multi-channel temperature sensors, 3-axis motion sensor, Hall sensor, BLE 5.X module, LED indicator, optional RFID	-
Gateway Connectivity	Bluetooth 5.X (tag connection) + Wi-Fi/Cellular (cloud transmission)	Supports up to 150 concurrent ear tags
Storage Capacity	Local: 4-day offline data retention	Cloud: Permanent storage
Integration Protocols	API interface + MQTT protocols (for farm management software integration)	
Waterproof Rating	IP68	

System Architecture

Ear Tag (**TempSync™ Algorithm**) → Gateway (Wi-Fi/Cellular) → Cloud Platform (**PigInsight™ AI Analytics Engine**) → Terminal Dashboard / Farm Management Software (Native or Customer's Existing via API/MQTT) / Mobile App

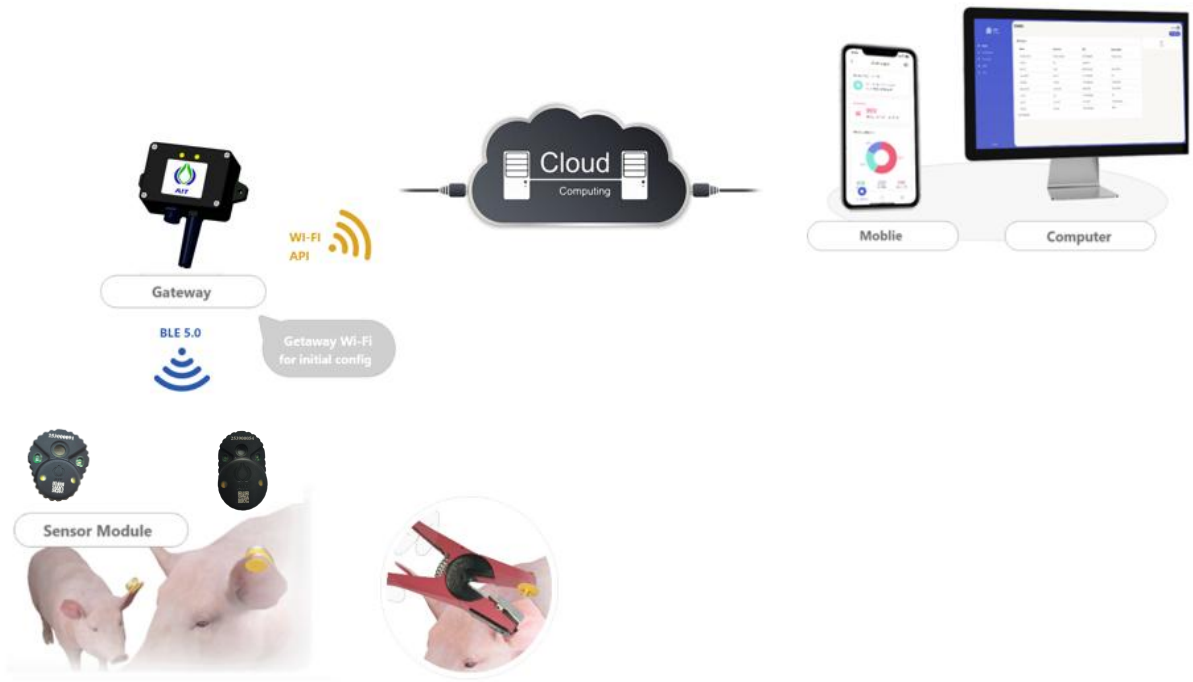

Figure 1. Pig Intelligent Health Monitoring System Configuration

How It Works - In 3 Steps

1. **Tag & Deploy**

   Apply smart ear tags using the included applicator. Use magnet to turn tag on and tag begins transmitting immediately.

2. **Connect & Monitor**

   Gateway collects data and sends to cloud. View real-time alerts via mobile app or dashboard.

3. **Analyze & Act**

   AI engine identifies estrus, farrowing, and health issues. Integrate data into your existing farm software.

Demo Kit Contents (HMS-DK-B2-07)

HMS-DK-B2-07 system includes the following parts in a package

Component Name	Part #	Quantity	Technical Description	Scalability
Smart Ear Tag	SOE200-02	48	Includes magnetic switch / dual-mode monitoring for body temperature and behavior	Can be purchased separately
Male Tag	MT-N-O-L04-AF-R1	48	RFID option available	Can be purchased separately
Gateway	GW-200-03	1	Wi-Fi and Cellular connectivity. Supports up to 150 concurrent devices	Can be purchased separately
Professional Ear Tag Applicator	PP200-02	1	Auto-retractable ear tag applicator	Can be purchased separately
Magnetic Switch Tool	MA-Y-01	1	Φ20x25mm strong magnet	Can be purchased separately
Cloud Service	HMS-100-12	1	Includes 12 months of data storage + AI analysis access	Renewable and upgradable
Farm Management Software + Mobile App	-	1 (license)	Integrated pig health module	Remote operation & real-time alerts

DIMENSIONS

Outline Dimensions： L: 40cm | W: 40cm | H: 10cm

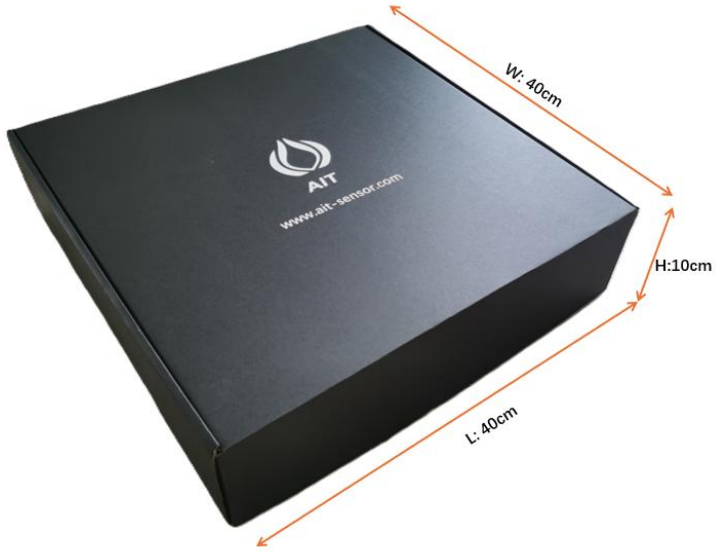

Figure 2. Package Dimensions

Package Highlights

1. **User-Friendly Design**: Small-scale trial friendly—48 independently packaged ear tags meet small-scale testing needs, eliminating the need for additional repackaging or complex operations. Ready to use out of the box, with intuitive mobile app support for on-site teams.
2. **Flexible Expansion & Seamless Integration**: Supports customization of the pig health module; integrates with customers' existing farm management software via standard API interfaces and MQTT protocols—no disruption to current IT infrastructure, lower implementation barriers.
3. **Comprehensive Technical Support Package**: Complimentary 3 remote debugging sessions + electronic copy of the Installation and Operation Guide; dedicated support for software/app setup and integration.

What's Included in the Demo Kit vs. Commercial Version

Feature	Demo Kit	Commercial Version
Service Period	1-year basic cloud service	Customizable as needed
Ear Tag Type	Customized for Sow only	Specialized （Sow/Piglet）
Data Retention	12-month rolling storage	Customized storage + API services
Software Integration	Basic API/MQTT integration support	Full API interface + MQTT protocol integration + custom adaptation services

Quality Certification

- Certified to ISO 9001:2015 Quality Management System standards
- Compliant with GB/T 2423.1-2008 environmental testing requirements for electrical and electronic products
- IP68 waterproof rating

Reliability Qualification Test

No.	Test Item	GB Standard	Test Result
1	Low temperature test	GB/T 2423.1-2008/IEC 60068-2-1：2007	Pass
2	Damp heat cyclic	GB/T 2423.4-2008/IEC 60068-2-30:2005	Pass
3	ESD test	IEC 61000-4-2:2008	Pass
4	Rolling test / Ammonia water	AIT standard	200,000 times
5	85°C/85%RH test	GB/T 2423.3-2016	Pass