Hi Rancher



User Manual
EID Panel Reader

V26.11.01


Hi Rancher

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1. Introduction

HiRancher EID Panel Reader

The HiRancher EID Panel Reader is a panel-mounted RFID reader designed for livestock electronic identification. Its split design, with a separate controller and antenna, offers flexible installation and convenient integration into livestock management systems.

Supporting both HDX and FDX-B low-frequency RFID technologies, the reader complies with ISO 11784/11785 standards and operates at 134.2 kHz. It offers reliable, long-range reading of compatible electronic animal tags, including those from Afimilk, DeLaval and Allflex.

A built-in 64-level automatic tuning system automatically adjusts the reader when powered on and continuously optimizes its operating performance under changing environmental conditions. A synchronization function also allows multiple readers to operate in close proximity while minimizing interference.

With high receiving sensitivity and stable performance, the reader supports Modbus RTU communication for easy system integration. The communication baud rate is configurable from 9,600 to 115,200 bps, supporting flexible data transmission over different network setups.

Typical Applications:

Electronic feeding stations, automated feeding troughs, milking stations, livestock handling and access control systems, and intelligent weighing systems.

Performance index

Operating Voltage	12-36V
Working current	400mA (12V)
Power requirements	linear regulated power supply
Circuit protection	with polarity protection and overvoltage protection (MAX 60V)
Working frequency	134.2KHZ
Maximum recognition distance	900mm
Support tag type	HDX、 FDX-B
Communication Interface	RS232 RS485
Working humidity	10% -90% RH (No condensation)
Operating temperature	-25 ℃ - +70 ℃
Protection level	IP67
Shell material	aluminum+Grade A Bakelite (Insulation, flame-retardant, heat-resistant, corrosion-resistant)
Installation method	Screw fixed, reserved installation hole

2. Signal Indication

RED LED ——— Power Indicator

GREEN LED —— Read Indicator

After power is applied, the red LED flashes twice, and the reader enters the automatic tuning state, adjusting its parameters according to the working environment.

If the red LED continues to flash, the tuning parameters may be abnormal. Please check whether the antenna is properly connected or refer to the installation guide. If the red LED does not light up, please check the power supply.

When the reader detects an RFID tag, the green LED lights up after successful decoding.

The reader is set to master-slave mode by default. To read data, the host must send a command to the reader.

3. Product Selection Model

Model	Dimensions (L x W x T, mm)	HDX Read Range*	FDX-B Read Range*
EPR-10040	1000*400*15	0 - 900	0 - 650
EPR-6040	600*400*15	0 - 800	0 - 600

*Note: The above is the test data of 12V lithium battery in mm under no interference environment.

4. Read Performance Instructions

Reading performance interference factor

- **Ear Tag Orientation:** In order to obtain the maximum reading distance, the axial direction of the ear tag and the reader antenna coil must be properly aligned (see the reader reading area and ear tag orientation diagram).

- **Ear Tag Quality:** Each ear tag manufacturer has different requirements for the excitation signal energy needed to operate the internal circuitry of the ear tag, as well as different levels of ID coding information transmitted back to the reader. Therefore, ear tags produced by different manufacturers may exhibit different reading distance performance.

- **Ear Tag Movement:** Different readers have different antenna sizes, and the effective "reading area" of readers with smaller antennas is also smaller. The readers are designed to read moving ear tags, including linear and rotational movement. If an ear tag moves at high speed through the reading area or changes its direction of movement, it may not remain in the reading area long enough for its ID coding information to be obtained.

- **Ear Tag Size:** Larger ear tags usually contain larger receiving antennas, which provide a longer reading distance than smaller antennas.

- **Ear Tag Type:** HDX ear tags of the same size generally have a longer reading distance than FDX-B ear tags.

- **Adjacent Metal Objects:** An ear tag or a metal object near the reader can weaken and distort the electromagnetic field generated by the RFID system, thus reducing its reading distance.

- **Electrical Noise Interference:** The use of RFID ear tags and readers relies on electromagnetic signals. For example, electrical noise emitted by computer monitors can interfere with the transmission and reception of RFID signals, resulting in a shorter reading distance.

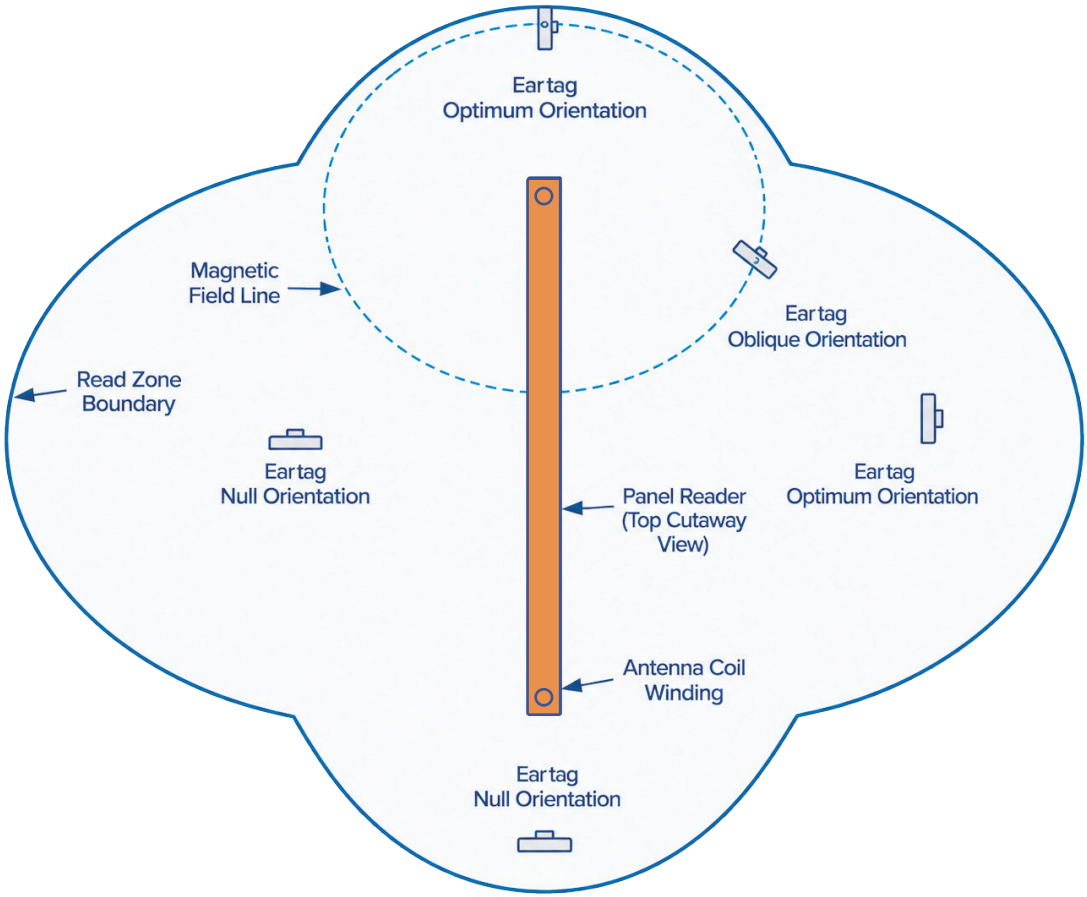
- **Power Supply Interference:** The power supply selected by the user must be a stable linear power supply with a rated output voltage of 12 to 36 V and a minimum current of 1.0 A. Some power supplies may reduce the reading distance due to excessive electrical interference. The output voltage ripple of a suitable power supply should be 3 mV or lower.

- **Ear Tag / Reader Interference:** When multiple ear tags are located within the reader's excitation field, or when other unsynchronized readers emit excitation energy nearby, the reader's performance may be adversely affected or the reader may even become unable to operate.

The reader reads the geometry of the area

The reading area is the three-dimensional space in which an ear tag, when stationary and in the optimal orientation, can be successfully read. The diagrams below show two-dimensional views of the reader's reading area and the corresponding ear tag orientations, from left to right and from top to bottom. They also indicate the orientations that provide the maximum reading distance and those in which reading is not possible. The reading area is symmetrical along the centerline of the reader's plane.

The maximum reading distance is achieved when the magnetic field lines of the reader are perpendicular to the surface of the ear tag, or when the ear tag axis is perpendicular to the midpoint of the reader plane. As the ear tag moves from the midpoint toward the edge of the reader, tilting the ear tag while keeping it perpendicular to the magnetic field lines can help achieve the maximum reading distance, as shown in the figure below.



Reader Reading Area and Ear Tag Orientation Diagram

5. Installation Guide

The package includes the reader controller, panel antenna, synchronization signal splitter, installation guide, and a 5-meter cable for connecting the reader to a PC. The MODBUS-HDX application is a simple and convenient PC tool that allows users to modify the reader's factory settings to suit their specific requirements.

If users are unfamiliar with the reader's operating characteristics, it is recommended to connect the reader to a computer before installation and use the MODBUS-HDX software to test different operating modes with the ear tags. This helps users evaluate the reader's performance under different operating conditions.

To ensure optimal performance, several factors should be considered when selecting or preparing an installation site or integrating the reader into other equipment. Before installation, users should simulate the intended installation environment whenever possible and verify that the required reading distance can be achieved. The following factors may affect overall system performance.

(A) Metal surfaces and structures: The reader uses RFID technology to communicate with the ear tag. Metal objects, especially magnetic metals and objects containing surfaces and closed-loop structures, will absorb the electromagnetic field of the reader or cause the deviation of the electromagnetic field, thus seriously reducing their reading distance performance. Ideally, the reader shall be mounted or suspended from non-metallic structures without metal surfaces parallel to the plane of the reader. Well-constructed wood, fiberglass, plastic or concrete (excluding steel bars) are suitable materials for reader installation. To maintain the reading distance of the reader, the metal surface and structure should be kept at a certain distance from the reader, at least equivalent to the diagonal length of the reader.

(B) Electrical machinery: Electronically controlled electrical machinery emits high-frequency signals and causes interference, such as motor speed controllers, dimmers, and solid-state relays. When testing the reader, the user needs to activate all the machinery nearby, and make sure there is no potential source of interference. When connecting the power cord for the reader, avoid using the same line phase as other electrical equipment.

(C) Other ear tags: If the reader is installed in one place and the animal wearing the ear mark appears in all locations around the reader (e.g., the feeder), precautions must be taken to ensure that only animals in the designated reading area will be read. Ear tags that appear anywhere around the reader may be read, and if multiple ear tags appear at the same time, it is possible that some will not be read. In this installation case, metal plates can be used to block the ear tags that are not to be read, but this shielding may reduce the reading distance of the desired reading area.

(D) Other readers: Using other ear tag readers or moving handheld readers within 20 meters will reduce the reading distance and in some cases lead to missed reads, so the synchronization signal should be connected or avoid using them at the same time, see details (synchronous description).

(E) Power ground: Before permanently installing the reader, ground the main power supply correctly, otherwise it may affect the antenna performance or burn the host. Ensure that the power box is installed within 3 meters of the reader and that the cables are of sufficient length for safe and protective arrangement.

(F) Cable protection: Many users do not need to use all the provided wires and functions, and the leads or joints exposed outside should be protected by insulating tape from contact with potentially fatal external voltage, such as in the equipment housing or terminal boxes. To avoid animal damage to cables, cables in these areas should be arranged in the protective pipe.

(G) Install accessories: After the location and installation method are determined, the reader can be permanently installed to the predetermined location through the preset installation hole. Non-magnetic mounting fittings (stainless steel, brass or nylon bolts) are recommended and most standard steel bolts do not affect the performance of the reader.

6. Synchronous Instructions

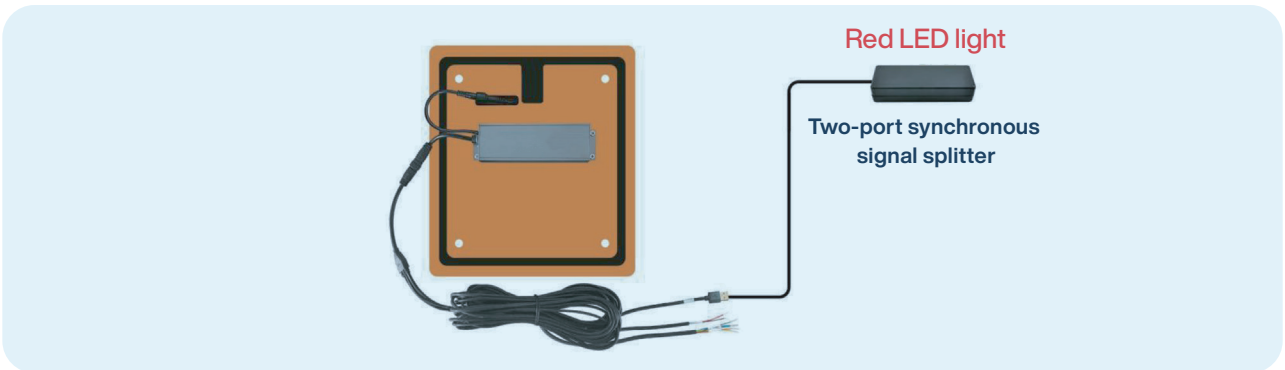
The EID Panel Reader features a linear topology for its synchronization (CAN-bus) network. To ensure normal operation, the synchronous signal splitter must be connected as shown in the schematic diagram below. The synchronization bus (CAN-bus) uses a USB interface and can be freely extended using standard USB exten sion cables, as shown in the figure.

Note:

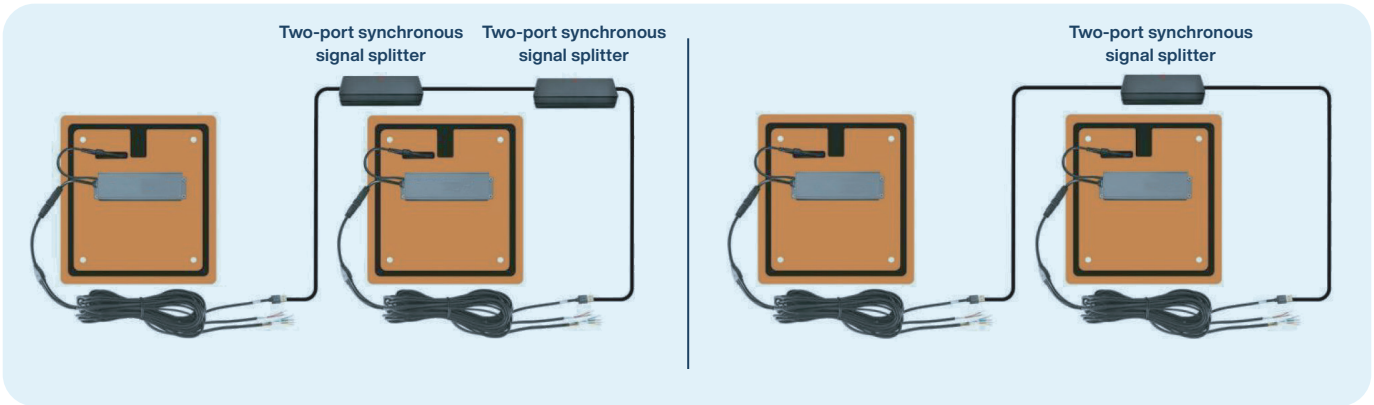
1. A TVS diode and a 120 Ω terminal resistor are built into the two-port synchronous signal splitter.

2. When any reader in the network reads the electronic ear tag, the LED on the two-port synchronous signal splitter flashes regularly at a constant speed. If the light flashes abnormally or stays on constantly, the synchronization network may fail and affect the reading performance. Please check as soon as possible. When checking, please check all power connections first, and then read the ear tag. If a reader is powered on and the synchronous signal splitter flashing is abnormal, it indicates that the reader is faulty and needs to be removed.

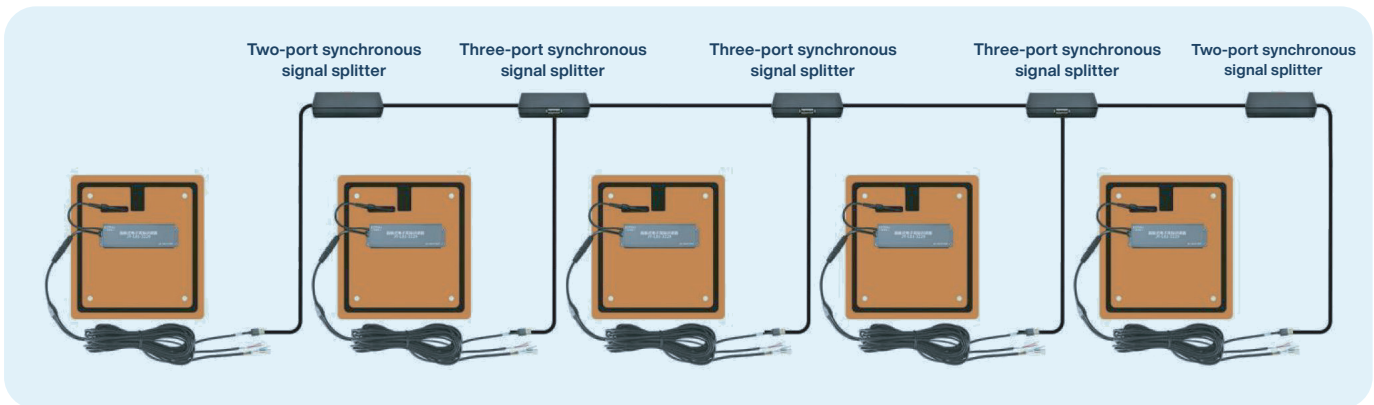
(1) In Single Use



(2) When Using The Two Units (choose One Option)



(3) When Using Multiple Stations



7. Optional Accessories

Name	Model	Function	Explanation
Polymer lithium battery	12V10000mAh	output power≤60W current≤5A	Convenient for users to use when using the test machine
Low-noise linear voltage-stabilizing power supply	P3a	input power: 35W output voltage: DC 12V	And a ripple noise of <1 mV
Common mode difference mode input and output integrated frequency converter filter	FIR 3.0KW-6A-VO2	Eliminate the common mode and differential mode signal interfer ence in the input and output of the frequency converter	Eliminate the adverse effects of frequency converter and UPS power supply, and optimize the identification effect
The RF interference detector		Look for sources of electromagnetic space interference	Consult with the sales engineer for more details



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