Smart Indicating System

Product Instruction/ User Manual

WALK HORIZON
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Legal Notices for 2017 Walk Horizon

Walk Horizon Centralized Indicating System

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Confidential Information

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This document consists of instructions of Smart Indicating System, which includes technical parameters, function instructions and notices of following components:

- RFID reader **WH-SR1000**
- RFID tag **Tag-RRL100**
- RFID tag **Tag-DRL100**

Please note:

1. For above components, the exterior looking, parameters and other technical details of products may vary from which are provided in this document. It can be due to technical updates without official notices.
2. Above components, as industrial grade products, shall be implemented and modified by specialists, who are reasonably considered as qualified, in order to ensure its technical integrity.

FCC CAUTION:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

– Reorient or relocate the receiving antenna.

– Increase the separation between the equipment and receiver.

– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

– Consult the dealer or an experienced radio/TV technician for help.

FCC 20cm Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20c mbetween the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Content

RFID Reader WH-SR1000

The RFID reader supports long distance indoor environment wireless communication with active RFID tags, and basically provides 5 functions:

- Private encryption protocol enforced wireless transmission to RFID tags;
- Receiving encrypted wireless signals from RFID tags;
- Transmission to the backbone via Ethernet;
- Receiving signals from the backbone via cable and Ethernet;
- Signal transferring, encrypting and decrypting between wireless channels and cable communication

Similar to the base stations in telecom cellular network, each single RFID reader covers a cellular zone, and hence multiple readers work together to cover certain area.

Features

1. High sensitivity, supports long distance transmission and receiving up to 100m approximately under ideal scenario. The actual covering radius still relies on on-site tests to determine.
2. Being with encrypted communication (private protocol), the reader strengthen the security at certain level.
3. With strong resistance to multiple sorts of interference, thereby guaranteeing the reliability at certain level.
4. Supports full-duplex communication with active tags Tag-RRL100 and Tag-DRL100, pass operational signals to, and collecting feedback & heartbeat signals from those types of tags.
5. Simultaneously works with no more than 400 tags in the cellular zone, in order to guarantee sufficient level of performance and availability.

Target Usage Scenario

- Light indicating under data center facility management scenario;
- Vehicle indicating under car parking or manufacturing scenario;
- Stored inventory indicating under warehousing scenario;

Exterior

#	Objects	Function
1	Power (PWR)	To connect the power supply to the reader.
2	Red light (POW)	Power indicator indicating the power supply status of the reader. Instant on when the power is supplied.
3	Indicating light (RUN)	Working status indicator - flashing (200ms per) when the reader operates normally; instant on/off when operates abnormally.
4	Indicating light (RF1)	RF channel 1 working status indicator, flashes when RF1 operates normally.
5	Indicating light (RF2)	RF channel 2 working status indicator, light status reverses each time when the reader receives a *Feedback* signal from a tag.
6	Indicating light (RF3)	RF channel 3 working status indicator, light status reverses each time when the reader receives a *Heartbeat* signal from a tag.
7	Indicating light (NET)	Reader receives the host computer instruction, flashes automatically.
8	USB port (USB)	For manufacture debug only.
9	RJ45/ Ethernet connection (LAN)	The data connection between the reader and the backbone system;
10	Antenna#1 (RF1)	RF: 2.450GHz Where the antenna is screwed to transmit the signals to tags.
11	Antenna#2 (RF2)	RF: 2.460GHz Where the antenna is screwed to receive *Feedback* signals from tags.
12	Antenna#3 (RF3)	RF: 2.440GHz Where the antenna is screwed to receive *Heartbeat* signals from tags.

Parameters

Communication Related	
Antenna Interface	Omni-directional or Directional antennas.
Communication Distance under ideal environment	Omni-directional antennas: 100m in maximum (in other words, the radius of the cellular zone is ≤100m accordingly); Directional antennas: 200m in maximum
Frequency	Transmitting frecuency: 2.450GHz; Receiving frecuency: 2.440GHz; 2.460GHz
Transmission Power	10dbm
Receiving Sensitivity	−102 dBm, highly sensitive
RF Communication Speed/bit Rate	250 kbps, GFSK modulation
Communication with the Backbone	Ethernet, 10M / 100M adaptive
Operating Environment	
Operating Temperature	−25°C ~ 50°C
Storing Temperature	−40°C ~ 85°C
Operating Humidity	5% ~ 95% (no condensate water)
Electrical & Common Physical	
Operating Voltage	DC: 5V
Operating Current	1A
Exterior Material	Aluminum Alloy
Size	200mm (length)*145mm (width) *60mm (height)
Weight	0.75 kg

Common Failures & Addressing3

Issue	Possible Reasons	Recovery
Power Indicator (Red Light, POW) instant off	No power connection	Check the contact and polarity of power supply.
	Inactivated power-point	Activate or change the power supply.
(Ethernet) Communication Failure between RFID Reader and the backbone	No net cable connected	Check cable connection.
	Cable failures, e.g. short circuit, broken circuit or bad contact	Check circuit.
	Incorrect networking configuration of the Reader	Check IP and port settings at both the reader and the backbone sides.
	Mal-functioning of the Reader Ethernet module	Replace Ethernet module.

If above methods do not recover, please contact technical support.

RFID Tag Tag-RRL100 & Tag-DRL100

Tag-DRL100

Tag-RRL100

The two sorts of active RFID tags are specified to provide RFID technology supported interactive functions, which includes:

- Private encryption protocol enforced wireless transmission to a RFID reader through long distance;
- Receiving encrypted wireless signals from a RFID reader;
- Switching on/off the lighting module controlled by receiving signals, thereby providing a visual guiding function. A RRL tag has four lights in different colors, whilst a DRL tag has one in white;
- Detecting the clicking of the button, and hence transmitting *Feedback* signal to a reader, which can be seen as the trigger of certain IT functions;
- Transmitting *Heartbeat* signal to a reader at a certain time interval as the indicator of its operating status;

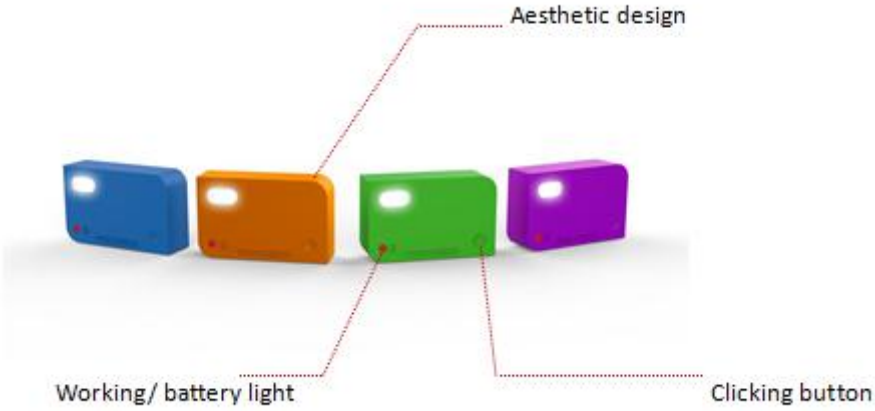
Features

1. Simultaneously operating without collision. A large group of tags can work within a limited area with orchestration;
2. The tags support full duplex communication, transmission and receiving took place simultaneously;
3. As active tags, Tag-RRL100 and Tag-DRL100 need batteries as their power supply; it is due to their higher power consumption to support long distance transmission of wireless signals. For the two types, their average total operating hours between recharges are 9 hours over 1.5 years (self-discharge considered) or 240 hours (constant on);
4. The tag battery is monitored, and alert can be generated if the power level becomes considerably low;

Target Usage Scenario

- Light indicating under data center facility management scenario;
- Vehicle indicating under car parking or manufacturing scenario;
- Stored inventory indicating under warehousing scenario;

Exterior



Parameters

Communication Related	
Recognition Distance	Omni-directional antennas: 50m in maximum; Directional antennas: 200m in maximum
Transmission Power	3dbm
Receiving Sensitivity	-96dBm, high sensitivity
RF Communication Speed/bit Rate	250 kbps
Radio Frequency	Transmitting frecuency: 2.460GHz; 2.440GHz. Receiving frecuency: 2.450GHz;
Environmental & Common Physical	
Light	LED Tag-RRL100: 4 LEDs in Red, Green, Blue and White; Tag-DRL100: 1 LED in White
Low Voltage Alert	Default local alert via an indicating light
Battery Life	9 hours over 1.5 years (self-discharge considered) or 240 hours (constant on), heartbeat every 60 seconds
Battery	Tag-RRL100: ER18505M 3.6V, Replaceable Tag-DRL100: CR2450 3.0V, Replaceable
Operating Temperature	Tag-RRL100: -35°C ~ 50°C; Tag-DRL100: 0°C ~ 50°C
Storing Temperature	-20℃～85℃
Operating Voltage	Tag-RRL100: DC 3.6V; Tag-DRL100: DC 3.0V
Operating Current	≤30 mA when operating; ≤10 μA when standby
Exterior Material	ABS, PC, inflammable
Size	Tag-RRL100: 95mm (length)*45mm (width)*24mm (thickness) Tag-DRL100: 49mm (length)*30mm (width)*13mm (thickness)
Weight	Tag-RRL100: 0.08Kg; Tag-DRL100: 0.02Kg

Common Failures & Addressing

Issue	Possible Reasons	Recovery
Low voltage alert	Low battery	Return to manufacturer.
No signal detected	Extremely low battery	Return to manufacturer.
	Transmission module failure	Return to manufacturer.

If above methods do not recover, please contact technical support.

System: Interaction between RFID Reader and Tag

1. A round of operation starts with the RFID reader receiving a *Switch-on* signal from the backbone system via Ethernet (cable) . The reader then converts the instruction to wireless signaling, and broadcasts it via antenna RF1.
2. All tags (both types) in the coverage of the reader will receive the signaling via their receiving antennas; after deciphering and processing the signaling, each of the tags obtains its target tag ID and compares the ID with its own unique ID in its chip (EPC zone). If a tag whose ID is same as the target ID, it will determine itself as the target tag and then switch on the LED on itself.
3. If the button of a tag (both types) is clicked, the tag will send a encrypted *Feedback* signal to the reader via its transmission module. The signal is called *Feedback* because it is expected to take place after lighting up and is prepared for sending back to activate certain following operation.
4. The reader receives the *Feedback* signal, deciphers, processes and converts it into a message, which will then be sent to the backbone system via Ethernet.
5. The two types of the tags transmit their own working status signal (*Heartbeat*) to certain readers at a certain time interval via their transmission modules.
6. The reader receives the *Heartbeat* signal, deciphers, processes and converts it into a message, which would then be sent to the backbone system via Ethernet.
7. The two types of tags are designed to support full duplex communication. Above communication 2 and 3, 2 and 5 can be carried out simultaneously; whilst 3 (press the button) and 5(periodic heartbeat) can be carried out successively at a very short time interval.

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