

# WIA-FA Wireless Communication Device Specification

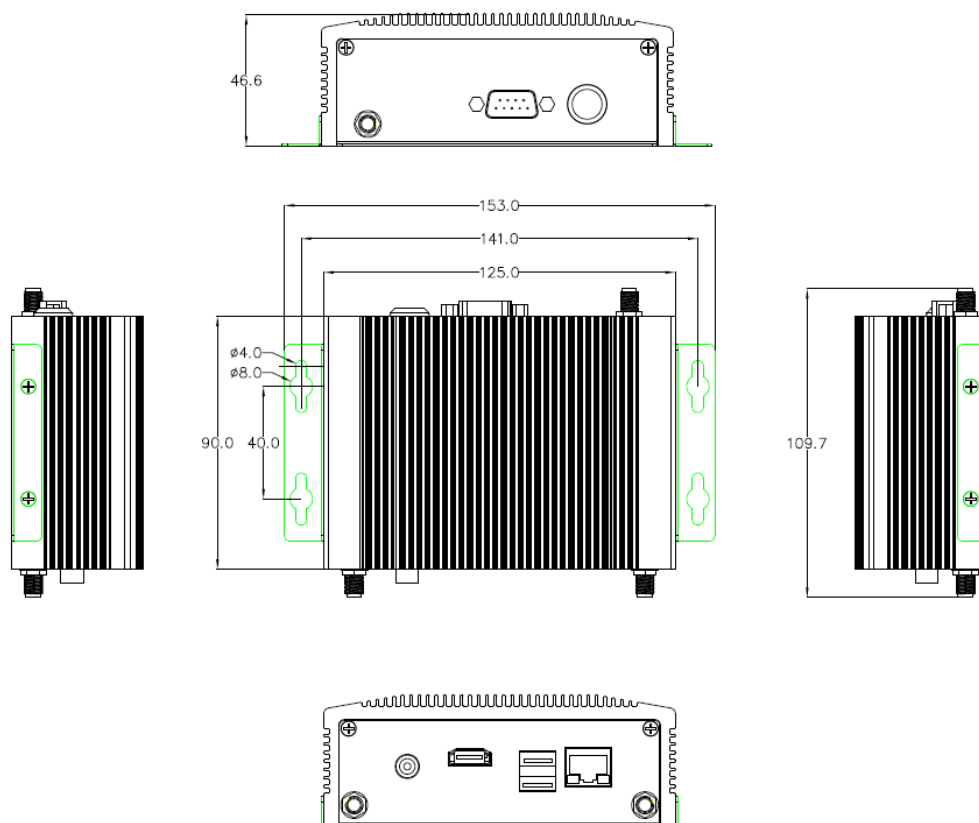
Model No.:WIA-FA-FD-X-RJ45

## 1. Introduction

WIA-FA wireless communication devices, developed by Shenyang Institute of Automation, Chinese Academy of Sciences according to the WIA-FA standard, are a group of products for wireless data transmission in factory automation. WIA-FA wireless communication devices are specially designed to meet the requirements of factory automation in terms of high real-time and high reliability. The typical networking structure of WIA-FA includes gateway devices, access devices (ADs), and field devices (FDs). The hardware platforms of the three types of devices are the same, but their software systems are different according to the functional requirements. The main technical indexes are given as follows:

- ◆ Input voltage 9~24V and power 5W;
- ◆ Operating environment: temperature 0~70℃ and moisture 0~85%RH;
- ◆ Network scale of one thousand nodes;
- ◆ The data period of nodes less than 10ms, for networks with 100 nodes;
- ◆ Communication reliability above 99.99%;
- ◆ Interconnection with TCP/UDP protocol.

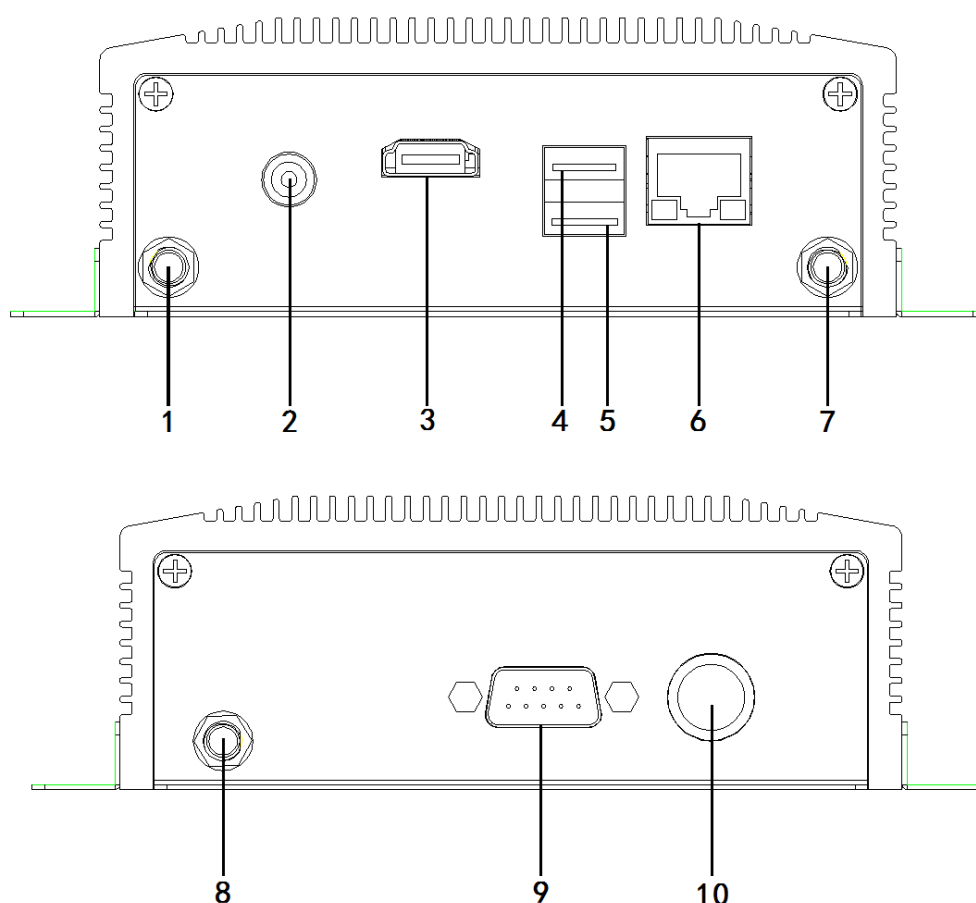
## 2. Device Size



## 3. Interface Description

WIA-FA wireless communication devices provide one adaptive Ethernet port with 10/100/1000Mbps, one power interface, one RS-232 serial interface, three antenna interfaces, one USB 3.0 debugging interface, one USB 2.0 debugging interface, and one HDMI debugging interface. The specifications and detailed descriptions

of the interfaces are given in the following table.

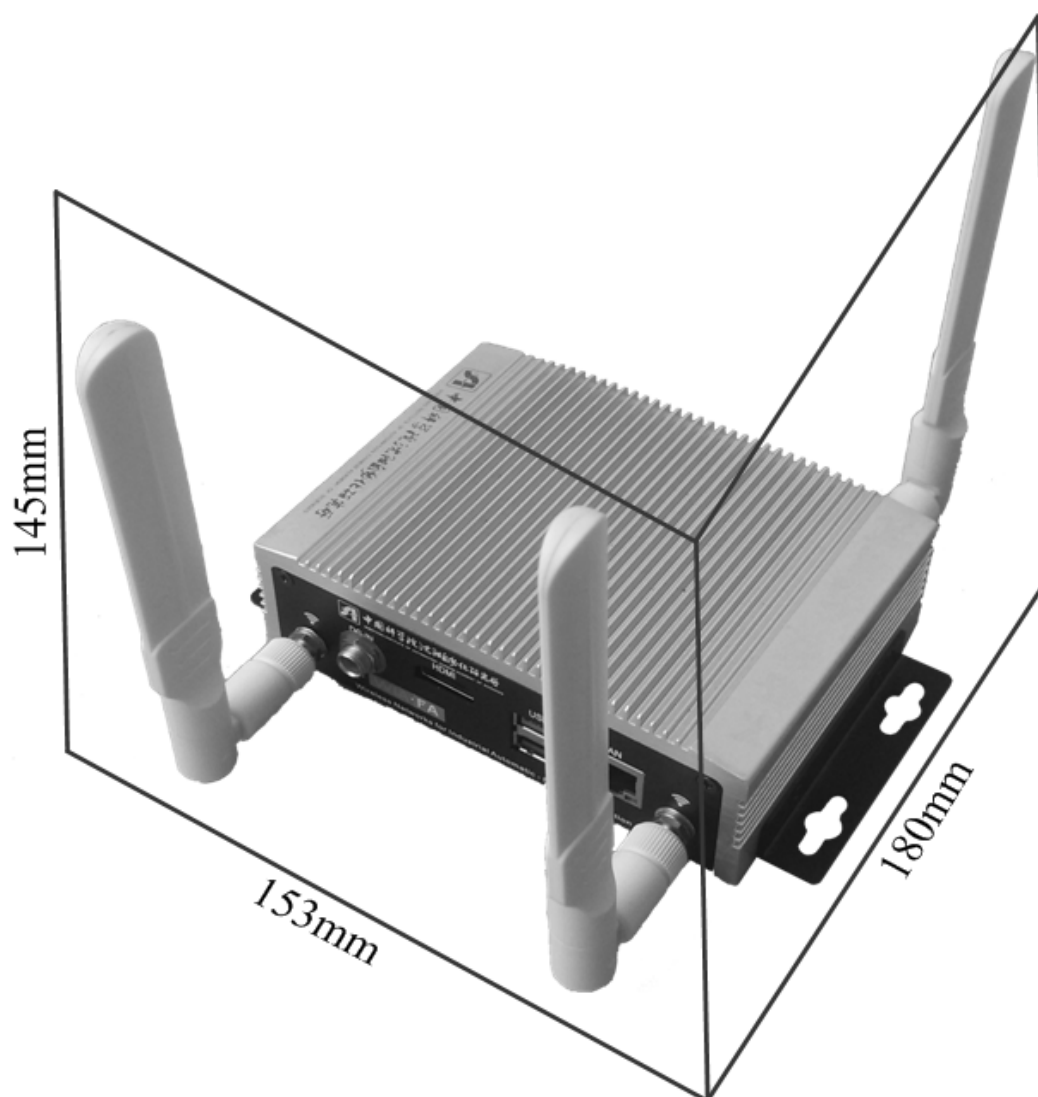


| No. | Interface           | External object                    | Description   |
|-----|---------------------|------------------------------------|---|
| 1   | Antenna interface 1 | Antenna or antenna extension cable | Internal pin and external threaded interface, with internal hole and internal threaded antenna or antenna extension cable |
| 2   | Power interface     | DC 9-24V                           | The inner core is DC+ and the outer ring is DC-   |
| 3   | HDMI interface      | Monitor                            | Used only as a debugging interface, not open to users   |
| 4   | USB 3.0             | USB device                         | Used only as a debugging interface, not open to users   |
| 5   | USB 2.0             | USB device                         | Used only as a debugging interface, not open to users   |
| 6   | Ethernet port       | User device                        | Adaptive network port with 10/100/1000Mbps and standard RJ45 interface  |
| 7   | Antenna interface 2 | Antenna or antenna extension cable | Internal pin and external threaded interface, with internal hole and internal threaded antenna or antenna extension cable |
| 8   | Antenna interface 3 | Antenna or antenna extension cable | Internal pin and external threaded interface, with internal hole and internal threaded antenna or antenna extension cable |

|    |                  |             |   |
|----|------------------|-------------|---|
| 9  | Serial interface | User device | RS-232 interface based on DB9                           |
| 10 | Switch button    | N/A         | Switch button with an indicator light in the outer ring |

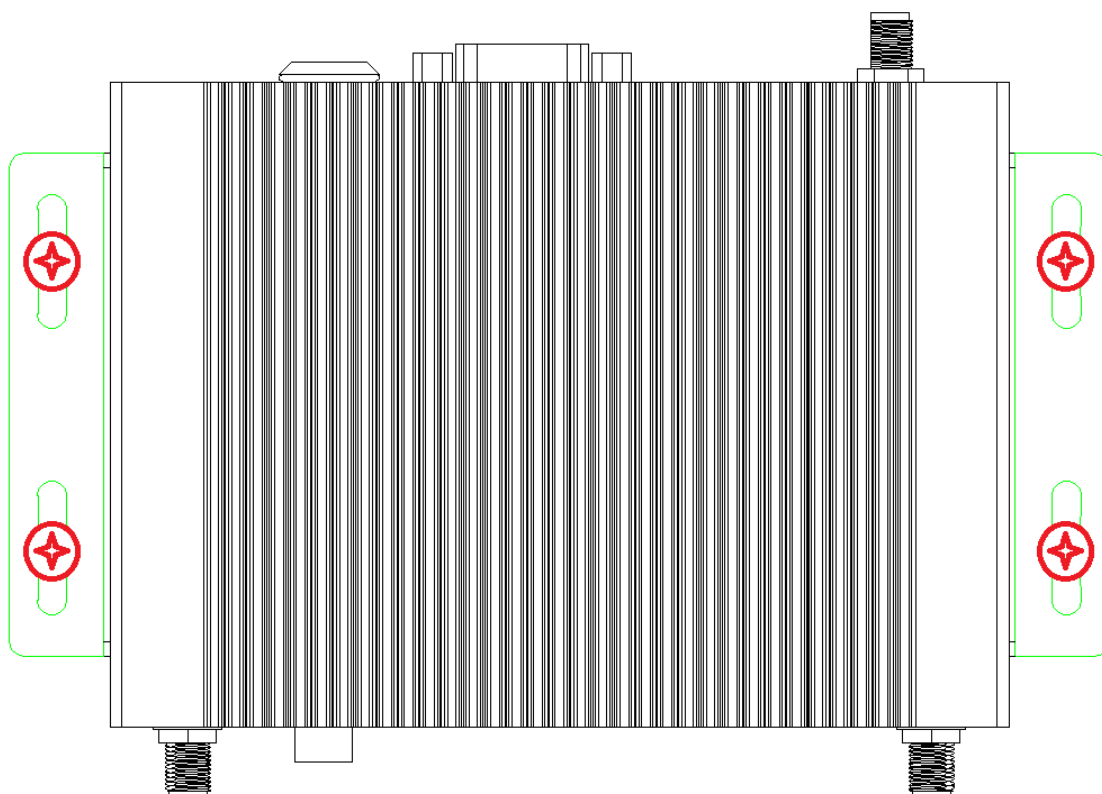
## 4. Installation Requirement

The WIA-FA wireless communication devices need to be placed horizontally. The size of the devices without antennas is 153mm×109.7mm×47mm. In order to guarantee that a WIA-FA wireless communication device can be properly installed, an area with the size of 153mm×180mm is at least required. Furthermore, if its antennas are placed vertically, the WIA-FA wireless communication device needs a height of 145mm. In summary, the total occupied space of a WIA-FA wireless communication device is with the size of 153mm × 180mm × 145mm.





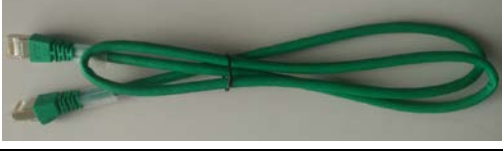

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Four screws are required to install a WIA-FA wireless communication device, and the maximum diameter for screws is 8mm. It is recommended to use screws with spring washer if the WIA-FA wireless communication device is installed on a mobile equipment with strong vibration. The installation and fixing schematic diagram is given as follows, in which the WIA-FA wireless communication device is tightly fixed by four screws with spring washer.



## 5. Accessories

The accessories of WIA-FA wireless communication devices are given as follows:

| No. | Accessory              | Quantity | Note   | Figure   |
|-----|------------------------|----------|--|--|
| 1   | Antenna                | 3        | Required   |  |
| 2   | Power line             | 1        | Required   |  |
| 3   | Ethernet cable         | 1        | Optional, customer self-supplied cable can be used |  |
| 4   | Antenna extension wire | 3        | Optional, only needed when moving antennas outward |  |

The installing method of antennas: Take an antenna out of the packaging bag, align it with the position of an antenna joint, and rotate the antenna clockwise until tight. The schematic diagram of installing an antenna is given as follows:



The connecting method of antenna extension cables: Take an antenna extension cable out of the packaging bag, align it with the position of an antenna joint, and rotate the nut clockwise until tight. The schematic diagram of connecting an antenna extension cable is given as follows:

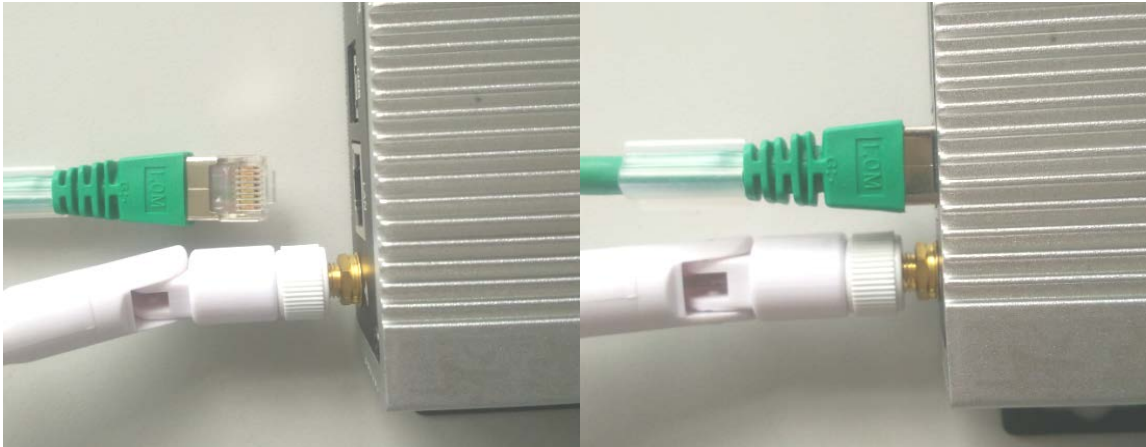


Note: Either antennas or antenna extension cables can be installed on a WIA-FA wireless communication device.

The connecting method of the power line: Take the power line out of the packaging bag, align it with the position of the power joint, and rotate the nut clockwise until tight. The schematic diagram of connecting the power line is given as follows:

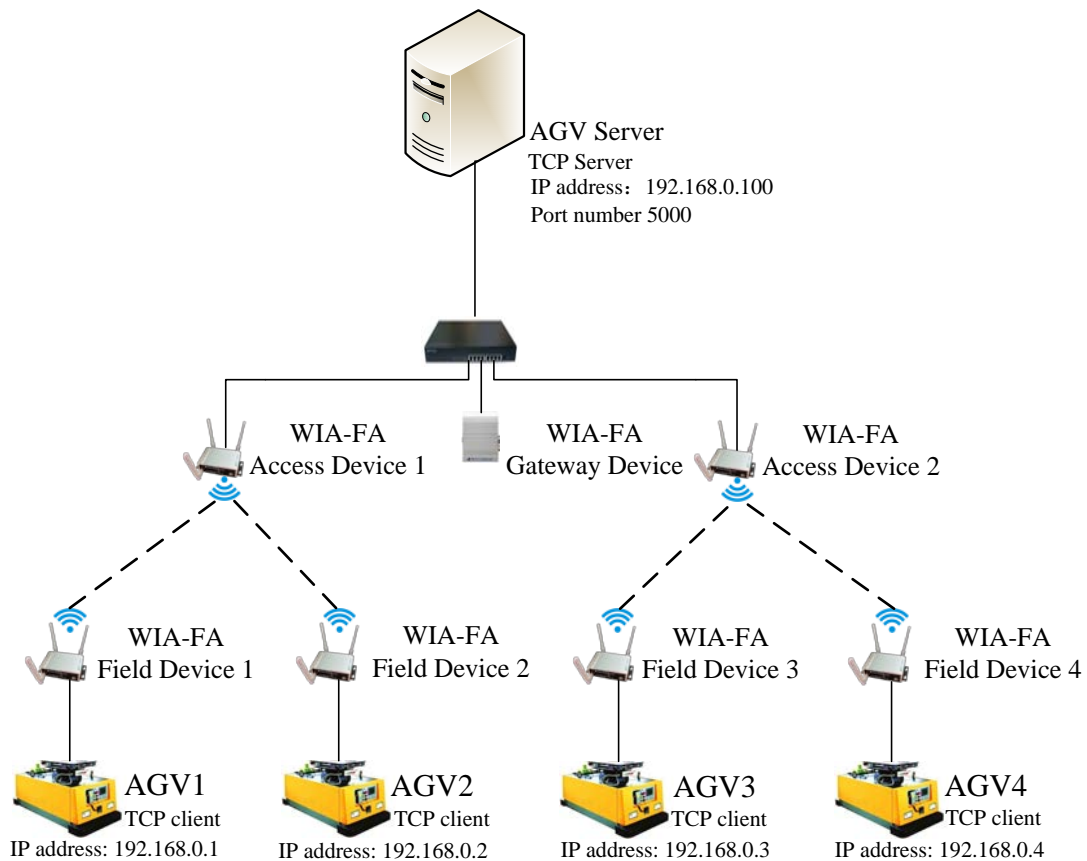


The installing method of the Ethernet cable: Take the Ethernet cable out of the packaging bag, align it with the position of the network port, and insert the Ethernet cable into the network port. After installation, the Ethernet cable cannot be pulled out directly. The schematic diagram of installing the Ethernet cable is given as follows:



## 6. Application examples

WIA-FA wireless communication devices are mainly used for wireless interconnection of machines and devices in the factory floor, especially logistics devices that are most widely used. Taking AGV applications as an example, the typical network architecture of WIA-FA networks for AGV applications is shown in the following figure. AGVs are connected to FDs through cables, and FDs communicate with ADs bidirectionally through wireless links. All ADs and the gateway are connected with a wired LAN through a switch, and the AGV data are finally sent to the AGV server.



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.

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.

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 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.