FS250 Hardware Development Manual

Record History

Version Number	Version Description	Date
V1.0	Initial Version	2016-12-07
V1.01	Add more detailed information	2017-04-18
V1.2	Add more detailed information	2017-07-06
V1.21	Modify V1.2	2017-07-07
V1.22	Modify V1.2 (The Connector Part)	2017-07-10
V1.23	Modify V1.2 (The Siza Dimensions Part)	2017-07-14

Contents

Chapter 1 Model、Optional and Configuration Item

1 Options& Configuration Items

No.	Options	Configurations	Note
1	Scanning mode	Auto-induction（Default）/Host Mode/Trigger Mode	Software setting
2	Terminator	CR （Default）/Disable/ CR + LF /TAB	Software setting
3	Default Interface	USB KBW（Default）/USB Serial Port/3V TTL/5V TTL /RS232/RS485/Wiegand/3V PS2	Software setting
4	Cable	Not Provided（Default）/2 meters straight USB cable /3 meters straight USB cable /2 meters USB slingshot cable/ 2 meters straight serial port cable	Accessories
5	Baud Rate	9600(Default)，8 bits，Stop bit 1 （3V TTL/5V TTL/RS232/RS485 etc. UART interfaces）	Software setting
6	Wiegand protocol	Auto（Default）/26,34,66	Software setting
7	Serial Number	Neutral（Default）/ No /Special	Hardware Customized
8	Label	Neutral（Default）/ No / Special	Hardware Customized
9	Beep after Good Decode	Enable（Default）/Disable/extended	Software setting
10	LED after Good Decode	Enable（Default）/Disable/extended	Software setting
11	Supplementary light	Enable（Default）/Disable/extended	Software setting
12	Positioning Light Control	Disable/extended	Software setting
13	5PIN Connector Direction	side（Default）/ up	Hardware Customized
14	Other Configuration	Other configuration needed, please contact	Customized

Note;

1、Choose the “Product mode” first, then choose the “Options” and “Configuration items”.

2、Please contact for “ Customized Mode”、” Other Configuration”、

”Other requirements“、”Software Setting”, which has MOQ requirements.

Chapter2 Interface

1、 External Connector and Built-in Configuration Pins

1.1 FS250 -- Three External Connectors

12 PIN FFC/FPC Connector (The lower connector of the right side showing as the below figure);

5 PIN USB Connector (The upper connector of the right side showing as the below figure, USB words imprinted on the case);

5 PIN configurable multifunctional connector (The left side showing as the below outline drawing, RS232 words imprinted on the case), All the PIN1 is on the right side of the below figure.

Configurable multifunctional connector can be set as one of the five interfaces according to the description of the following built-in configuration pins.

(Configurable multifunction interface)

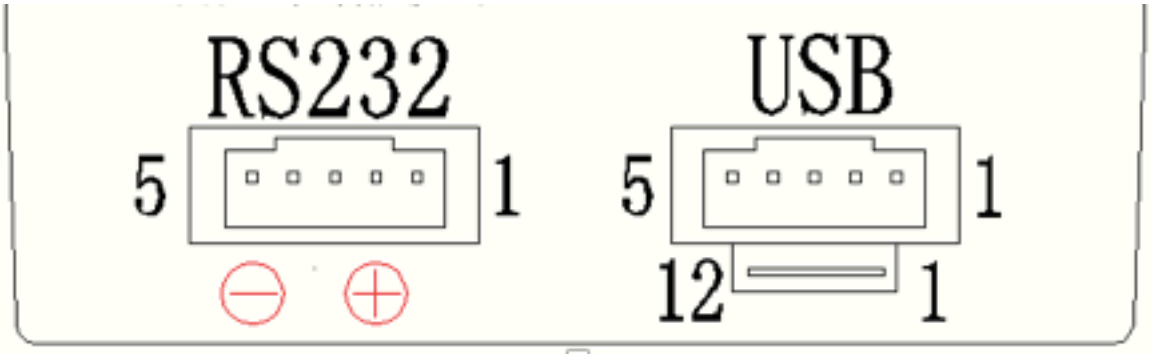


Figure1: External Connector Outline Drawing

1.2 FS250 Built-in configuration pins

Scanner is equipped with three built-in configuration pins, they are **3 power configuration pins; 6 configuration pins** and **10 configuration pins.**

The wire jumper cap is used to connect pins, only one can be set up out of the 5 configurable interfaces. Misusing with more wire jumper cap may cause problems such as data error, connector damage etc.

One of the power configuration must be set up.

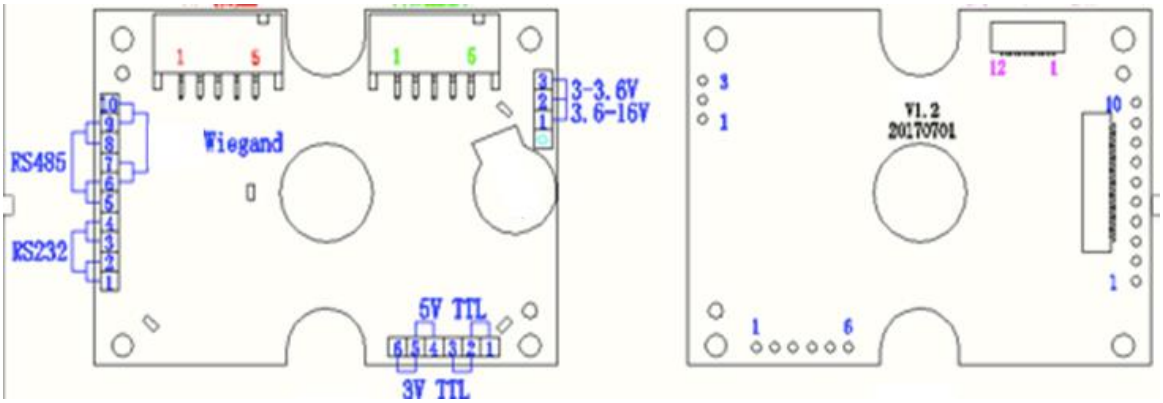
Hardware version	Configuration pin	Wire Jumper Cap	Interface Setting Specification
	3 power configuration pins	1	Select power one of two (3 Pins)PIN 1-2，3.6-16V (3 Pins) PIN 2-3，3.0-3.6V

Bulk Production			
FS250 V1.1	6 TTL configuration pins 10 interface configuration pins	2	5 Interfaces (6 Pins) PIN 1-2,4-5，5V TTL (6 Pins) PIN 2-3,5-6，3V TTL (10 Pins) PIN 1-2,3-4，RS232 (10 Pins) PIN 5-6,8-9，设置 RS485 (10 Pins) PIN6-7,9-10,Wiegand
Customization is acceptable			

The below is the specification of "**Hardware**" and "**multi-functional interface**"

Main Setting:

1.2.1 FS250 series is equipped with three built-in configuration pins, they are **3 power configuration pins**; **6 configuration pins** (5V TTL & 3V TTL) and **10 configuration pins** (RS232、RS485、Wiegand)



USB Connector Configurable Connector 12PIN FFC/FPC

Front View **Back View**

2、5 PIN USB Connector

Figure1 The upper connector of the right side is USB connector（PCB Board CON1）

The USB can be used as USB HID Keyboard or USB virtual serial port:

USB type can be set as USB1.1Full Speed（Default）or USB2.0 High Speed。

USB Connector PIN Description:

No.	Pin	Signal	Description
1	NC	Input	Reserved
2	VDD	Power supply	3~3.6V or 3.6~16V（including 5V）power supply
3	D+	Bi-directional	Input/Output: USB D+Signal
4	D-	Bi-directional	Input/Output: USB D-Signal

5	GND	Ground	Ground: power and signal ground

3、5 PIN configurable multifunctional connector

Figure1 The left side connector is **5 PIN configurable multifunctional connector** (PCB Board CON2). 5 interfaces，PIN function description as below:

3.1 Set as RS232

Serial number	Pin	Signal Name	Description
1	NC	Input	Reserved
2	VDD	Power supply	3~3.6V or 3.6~16V（including 5V,9V）power supply
3	TXD (RS232)	Output	RS232 UART1 Send
4	RXD (RS232)	Input	RS232 UART1 Receive
5	GND	Ground	Ground: power and signal ground

3.2 Set as 3.3V TTL

Serial number	Pin	Signal Name	Description
1	NC	Input	Reserved
2	VDD	Power supply	3~3.6V or 3.6~16V（including 5V,9V）power supply
3	TXD(3.3V)	Output	3.3V TTL UART1Send
4	RXD(3.3V)	Input	3.3V TTL UART1 Receive
5	GND	Ground	Ground: power and signal ground

3.3 Set as 5V TTL

Serial number	Pin	Signal Name	Description
1	NC	Input	Reserved
2	VDD	Power supply	3~3.6V or 3.6~16V（including 5V,9V）power supply
3	TXD(5V)	Output	5V TTL UART1 Send
4	RXD(5V)	Input	5V TTL UART1 Receive
5	GND	Ground	Ground: power and signal ground

3.4 Set as RS485

Serial number	Pin	Signal Name	Description
1	NC	Input	Reserved
2	VDD	Power supply	3~3.6V or 3.6~16V（including 5V,9V）power supply
3	B	Bi-directional difference	RS485 B

4	A	Bi-directional difference	RS485 A
5	GND	Ground	Ground: power and signal ground

3.5 Set as Wiegand

Serial number	Pin	Signal Name	Description
1	NC	Input	Reserved
2	VDD	Power supply	3~3.6V or 3.6~16V（including 5V,9V）power supply
3	D1	Output	Wiegand D1
4	D0	Output	Wiegand D0
5	GND	Ground	Ground: power and signal ground

4 12 PIN FFC/FPC Connector

Figure1 The lower connector of the right side is **12 PIN FFC/FPC Connector**（PCB Board J1）
FS250 can be connected to an external device interface through a FFC/FPC cable, the unused pins can be left vacant. PIN function description as below:

Serial number	Pin	Signal Name	Description
1	PS2_CLK_3V	Output	PS2 interface CLK signal (3.3V level), need external drive
2	VIN	Power supply	3~3.6V or 3.6~16V（including 5V,9V）power supply, configurable
3	GND	Power supply	Ground
4	RXD	Input	UART receive, 3.3V TTL level.
	IOX	-	FS250 Multifunctional interface, five Configurable interfaces, 5V RXD/3.3V RXD/RS232 RXD/A/D0.
5	TXD	Output	FS250 UART Send，3.3V TT Level
	IOY	-	FS250 Multifunctional interface, five Configurable interfaces, 5V TXD/3.3V TXD/RS232 TXD /B /D1
6	D-	Bi-directional difference	USB D- signal
7	D+	Bi-directional difference	USB D+ signal
8	KB_PC	Output	Default high level (3.3V level), Select the PC/ computer host connect to the keyboard. Low level select the PC/ computer host connect to the FS250
9	BUZ	Output	Buzzer signal output (3.3V level, high efficiency). Need external drive

10	LED	Output	Indicator light output, need external drive.
11	PS2_DATA_3V	Output	PS2 interface DATA signal (3.3V level), need external drive
12	nTRIG	Input	Trigger signal input, low level efficiency (3.3V level).

4.1 PS2 Interface

The PIN 1 is PS2_CLK_3V, the PIN8 is KB_PC, the PIN11 is PS2_DATA_3V, three signal lines are PS2 interface, 3.3V level; need external extended driver circuit, including 5V level switching circuit and FS250 & KB keyboard connection switching circuit.

4.2 UART Serial Port

FS250, the PIN 4 is RXD1, the PIN 5 is TXD1, 3.3V TTL level.

4.3 Multifunctional configurable interface

FS250, the PIN4 is IOX, the PIN5 IOY is multifunctional interface, the multi-functional interface can be set through built-in configuration pins
select on of the 5 configurable interfaces.

4.4 USB Connector

The same as 5 pin USB connector.

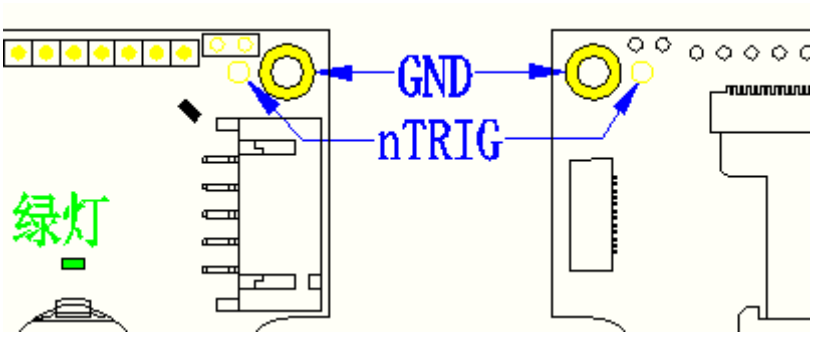
4.5 BUZ，LED

BUZ and LED after good decode, BUZ output is the pulse width model, LED output high level, all are 3.3V level.

4.6 Trigger

PIN nTRIG is set at a low electrical level to execute trigger operation; 3.3V level.

In the following figure, the nTRIG hole is near the CON2(5 pin USB connector) and J1 (12 pin connector).

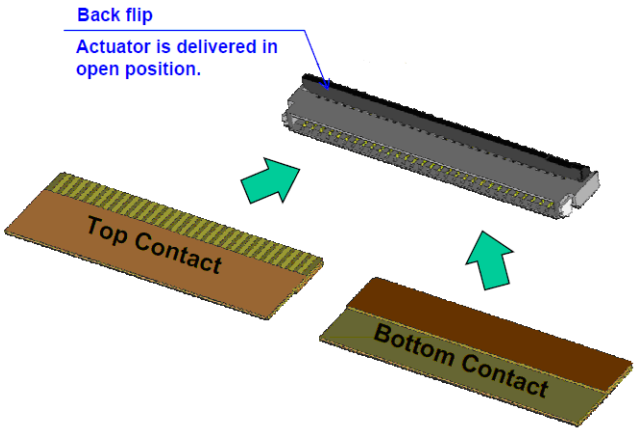


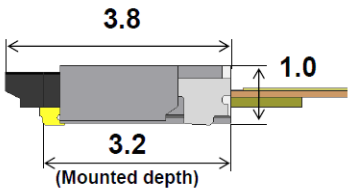
Front View Back View

5 Socket

5.1 Socket

The J1 socket is a 12 pin FPC (0.5mm space between each pin), pros and cons compatibility, the model No. is FH34SRJ-12S.5SH

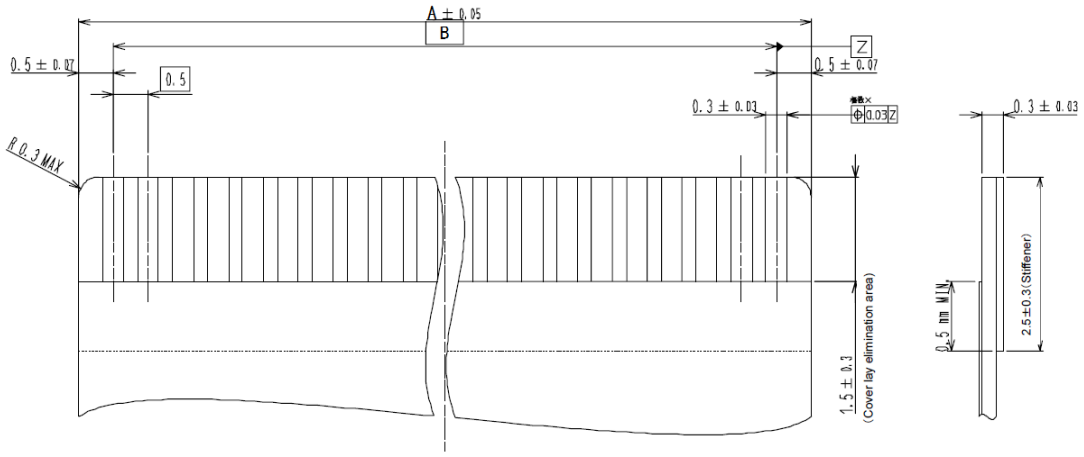




- 0.5 mm pitch
- Light weight: 0.098 g (30 pos.)
- FPC t: 0.3 mm

5.2 Flexible cable

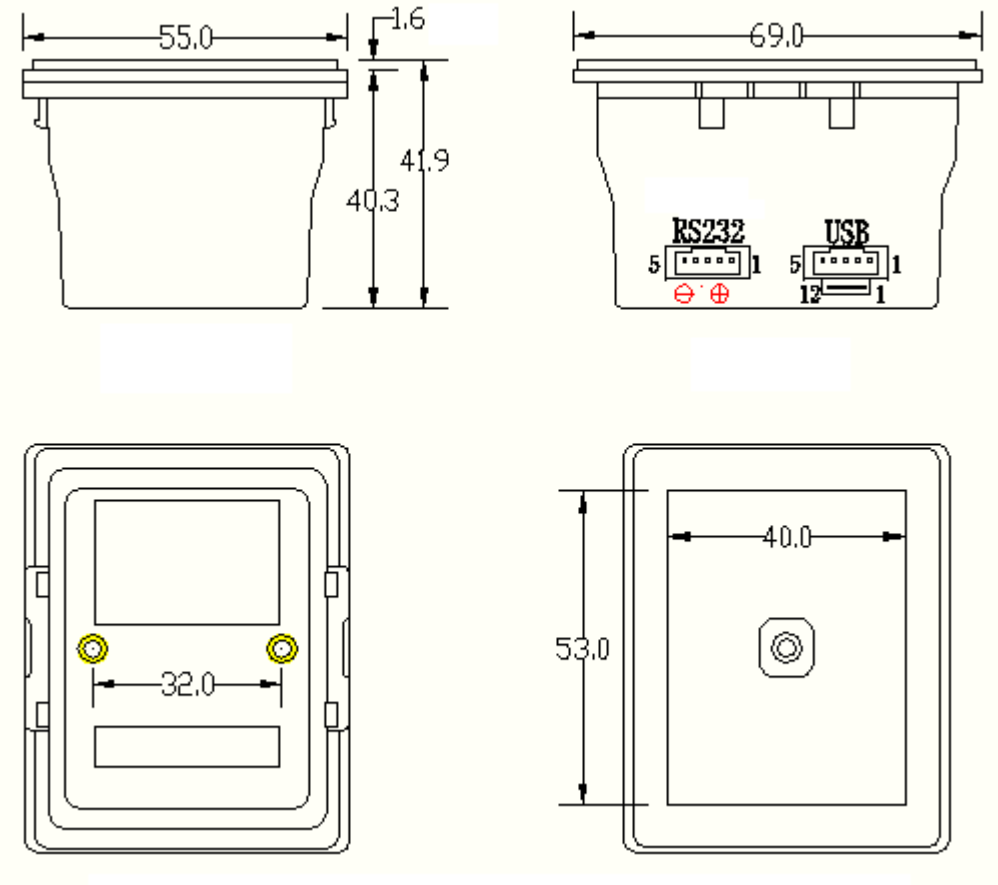
The connection of 12 pin flexible cable need refer to socket instruction book or as follows:



Chapter 3 Installation

(The CAD of the size figure referred to in this chapter can be provided, tolerance range ±0. 2mm)

1 Size Figure



FS250

2 Installation Position

2.1 FS250 Copper Nuts

There are two M3mm*5mm copper nuts on the back case of FS250, recommend to use M3mm machine screw to fix and lock in depth of 3~4mm.

3 Integration Requirement

3.1 Window

Left scanner is equipped with window, no need of extra window, scratches on the window can reduce engine performance.

CIS's responsiveness (mainly to wavelengths of white light) should be taken into consideration when choosing window material and color in order to achieve the possible highest spectral transmission, lowest haze level and homogeneous refractive index. It is suggested to use PMMA or optical glass with spectral transmittance of white light over 90% and haze less than 1%. Whether to use an anti-reflection coating or not depends on the material and application needs.

3.2 Dust and Dirt

The left scanner series must be sufficiently enclosed to prevent dust particles from gathering on the lens and circuit board. Dust and other external contaminants will eventually degrade the engine's performance.

3.3 Eye Protection

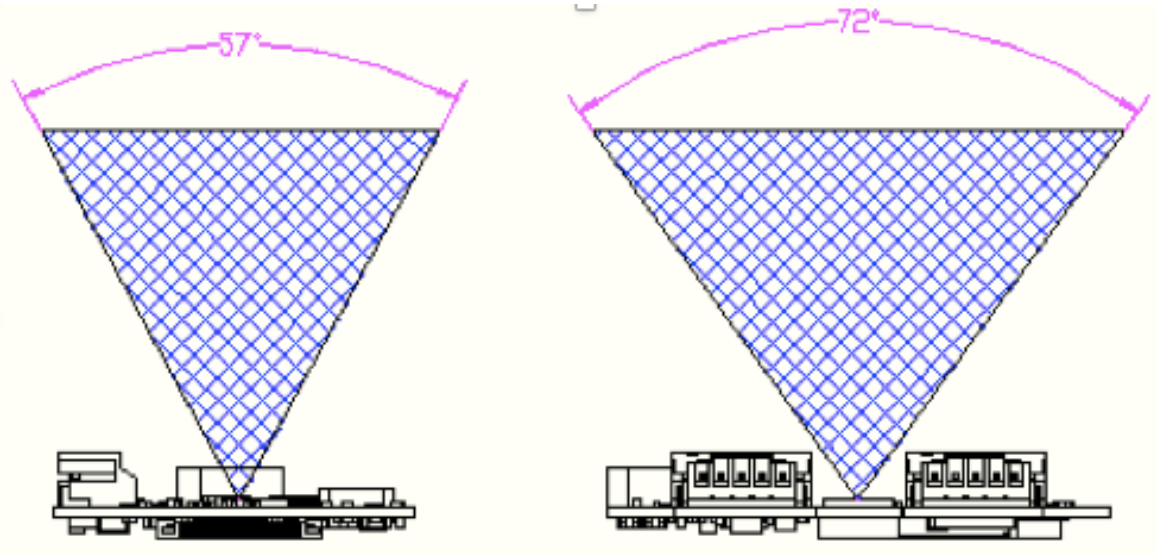
Avoid looking directly to the illumination and light beams.

3.4 ESD

ESD protection need to be implemented when installation and using.

3.5 FOV

The field of view must not block when scanning, Vertical: 57°, Horizontal: 72°



Vertical: **Horizontal:**

3.6 Environmental

Environmental	Parameter
Operating Temperature	-20℃ ~ 55℃ , Maximum 80℃
Storage Temperature	-40℃ ~ 80℃
Humidity	5% ~ 95% (no-condensing)
Ambient Light	Max.100,000 Lux

Chapter 4 Electrical Characteristics

1 Operating Voltage

Ta=25℃

1.1 Operating Voltage

Parameter	Description	Min	Standard	Max	Unit
V_{in}(3-3.6V)	Voltage Supply	3.0	3.3	3.6	V
V_{in}(3.6-16V)	Voltage Supply	3.6	-	16	V

1.2 VDD 3.3V

nTRG , RXD(3.3V) ,TXD(3.3V) ,BUZ , DLED, PS2_CLK_3V, PS2_DATA_3V, PC_KB

Parameter	Description	Min	Standard	Max	Unit
V_{IH}	Input high level	2.2	-	3.6	V
V_{IL}	Input low level	-0.3V	-	0.5	V
VOH	Output high level	2.9	3.3	-	V
VOL	Output low level	-	0	0.3	V

1.5 5V DC characteristics：RXD(5V) ,TXD(5V)

Parameter	Description	Min	Standard	Max	Unit
V_{IH}	Input high level	3.6	-	5.5	V
V_{IL}	Input low level	-0.3V	-	0.5	V
VOH	Output high level	4.5	5	-	V
VOL	Output low level	-	0	0.3	V

2 Electric Current

(Ta=25℃)

Parameter	Conditions	Max	Unit
Operating Current	Input Voltage：3.3V	<230	mA
Operating Current	Input Voltage：5V	<190	mA
Operating Current	Input Voltage：10V	<100	mA
Standby Current（Serial Port）	Input Voltage：3.3V	5mA	mA
Standby Current（USB）	Input Voltage：3.3V	TBD	mA

3 Power Supply Requirements

Don't plug in and out the module when hot line

4 Ripple noise

Recommend to power input with low ripple noise，Proposed to control the ripple noise within 10mV*VIN (peak-to-peak).