

# AGM-070A0-I2-R

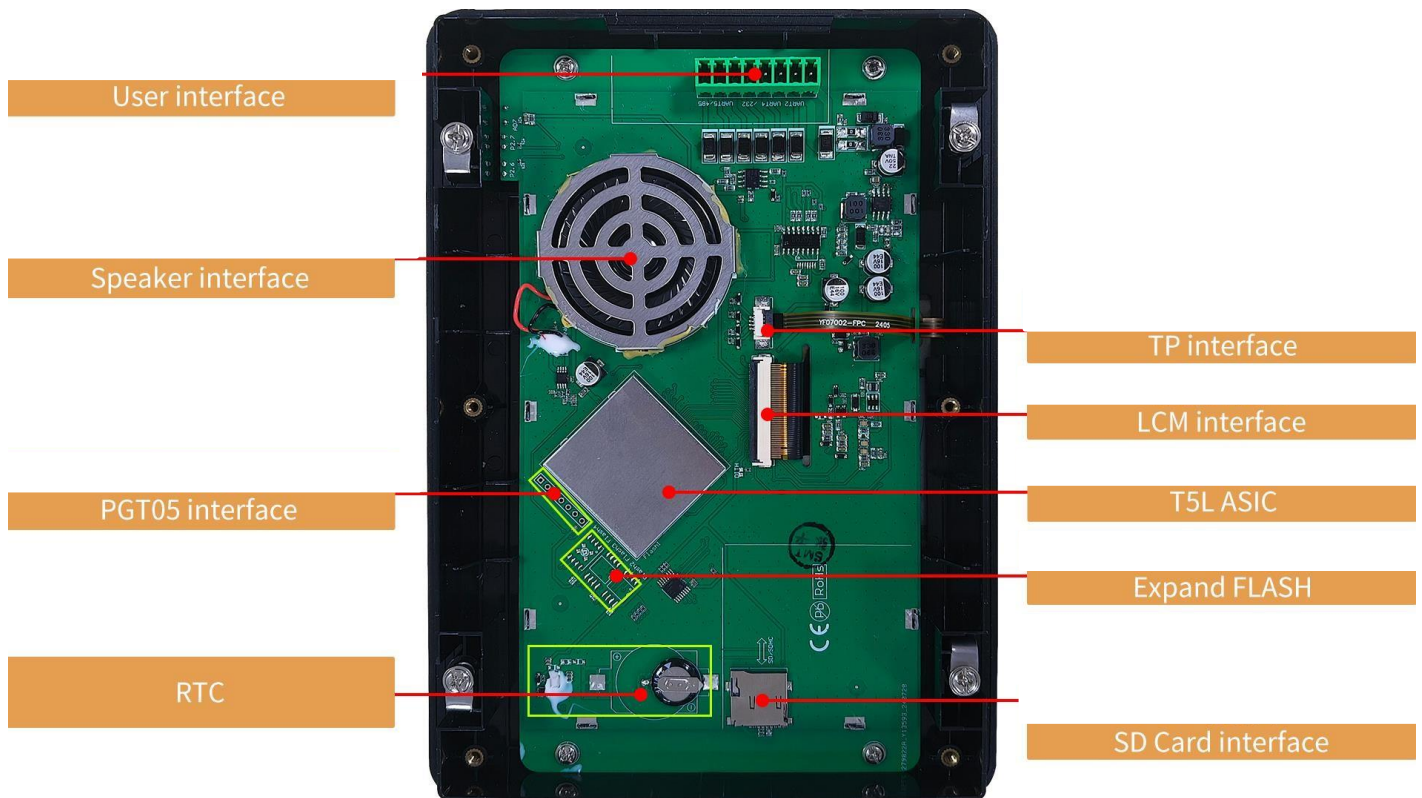
## Features:

- Based on T5L1, running DGUS II system, industrial grade.
- 7.0-inch, 800\*480 pixels resolution, 16.7M colors, TN TFT display.
- With built-in speaker, LED lamp and Photosensitive sensor.
- With conformal coating, with shell.



# 1、 Hardware and interface

## 1.1 Hardware interface



Hardware interface

## 1.2 Hardware and interface description

No.	Name	Description
1	T5L1 ASIC	Mass production in 2019, 1MBytes Nor Flash on the chip, 512KBytes used to store the user database. Rewrite cycle: over 100,000 times
2	LCM interface	FCC50_0.5mm, RGB interface
3	RTP interface	FCC4Pin_1.0mm interface
4	User interface	8Pin_3.81mm socket for power supply and serial communication. Download rate(typical value): 12KByte/s
5	Flash	16MBytes NOR Flash, for fonts, pictures and audio files. Rewrite cycle: over 100,000 times
6	Expand Flash pads	Three expansion slots are available, supporting expansion of NOR Flash and NAND Flash. The maximum expansion for NOR Flash is up to 64Mbytes. When combining NOR Flash and NAND Flash, the maximum expansion is up to 48Mbytes (using two expansion slots) + 512Mbytes.
7	Speaker	Onboard speaker. Power: 2W
8	RTC	Super-capacitor for power supply. Accuracy: $\pm 20$ ppm @25°C. It can work normally for 7 days after power failure
9	SD interface	FAT32. Download files by SD interface can be displayed in statistics. Download rate: 4Mb/s
10	PGT05 interface	When product crashes by accident, you can use PGT05 to update DGUS kernel and make the product return to normal

## 2、 Specification parameters

### 2.1 Display parameters

<b>LCD Type</b>	TN, TFT LCD
<b>Viewing Angle</b>	Normal viewing angle, 70°/70°/50°/70° (L/R/U/D)
<b>Resolution</b>	800×480 pixels (support 0°/90°/180°/270°)
<b>Color</b>	24-bit 8R8G8B
<b>Active Area (A.A.)</b>	154.20mm (W) ×85.88mm (H)
<b>View Area (V.A.)</b>	155.1mm (W) ×86.9mm (H)
<b>Backlight Mode</b>	LED
<b>Backlight Service Life</b>	30000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)
<b>Brightness</b>	250nit
<b>Brightness Control</b>	0~100 grade (When the brightness is adjusted to 1%~30% of the maximum brightness, flickering may occur and is not recommended to use in this range)
<p>Note: You can use dynamic screen saver wallpapers to avoid afterimages caused by fixed page display for a long time.</p>	

### 2.2 Touch parameters

<b>Type</b>	RTP (Resistive touch panel).
<b>Structure</b>	ITO film + ITO glass.
<b>Light Transmittance</b>	78%±3%

### 2.3 Serial interface parameters

<b>Mode</b>	UART2: RS232 UART4: RS232(OS Only available after OS configuration) UART5: RS485(OS Only available after OS configuration)				
<b>2、4 Voltage Level</b>	Test Condition	Min	Typ	Max	Unit
	Output 1	-	-5.0	-3.0	V
	Output 0	3.0	5.0	-	V
	Input 1	-15.0	-5.0	-	V
	Input 0	-	5.0	15.0	V
<b>2、4 Baud Rate</b>	3150~3225600bps, typical value of 115200bps				
<b>5 Voltage Level</b>	Test Condition	Min	Typ	Max	Unit
	Output 1	2.5	5.0	-	V
	Output 0	-	-5.0	-2.5	V
	Input 1	0	2.5	-	V
	Input 0	-	-2.5	-0.2	V
<b>5 Baud Rate</b>	3150~921600bps, typical value of 115200bps				
<b>Data Format</b>	UART2: N81 UART4: N81/E81/O81/N82 (OS) 4 modes (OS configuration) UART5: N81/E81/O81/N82 (OS) 4 modes (OS configuration)				
<b>Interface table</b>	8Pin_3.81mm; 8Pin_3.81mm Socket;				

## 2.4 Electrical specifications

<b>Rated Power</b>	<5W	
<b>Operating Voltage</b>	9~36V, typical value of 12V	
<b>Operating Current</b>	280mA	VCC=12V, VCC=12V, max backlight
	130mA	VCC=12V, VCC=12V, backlight off
<b>Recommended power supply: 12V 1A DC</b>		

## 2.5 Operating environment

<b>Operating Temperature</b>	-20°C~70°C (12V @ 60% RH)
<b>Storage Temperature</b>	-30°C~80°C
<b>Conformal coating</b>	Yes
<b>Operating Humidity</b>	10%~90%RH, typical value of 60% RH

### 3、Reliability test

#### 3.1 Electrostatic discharge test

Test temperature: 25°C. Test humidity: 50%RH.

Test process: the product was placed on the test bench to perform contact and air discharge in turn of the serial screen iron frame and display area. During the experimental process, it was observed whether the screen is dead, black, white, splash, or reboot. According to the experiment results, the performance is in line with the criteria GB/T 17626.2 B level and above.

Test standard :  EN 61000-4-2:2009     IEC 61000-4-2:2008     GB/T 17626.2-2018  
 Other:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Points Locations	Test Levels							
	-2kV	+2kV	-4kV	+4kV	-8kV	+8kV	-15kV	+15kV
屏幕					A	A		
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)


Test Points Locations	Test Levels							
	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV
屏框 J2	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

### 3.2 EFT test

Test temperature: 25°C. Test humidity: 50%RH.

Test process: the product was placed on the test bench to perform contact and the smart screen is energized by the power supply coupled with a EFT generator. During the experimental process, it was observed whether abnormal reset, display or touch phenomena occurs. According to the experiment results, the performance is in line with the criteria GB/T 17626.4 B level and above.

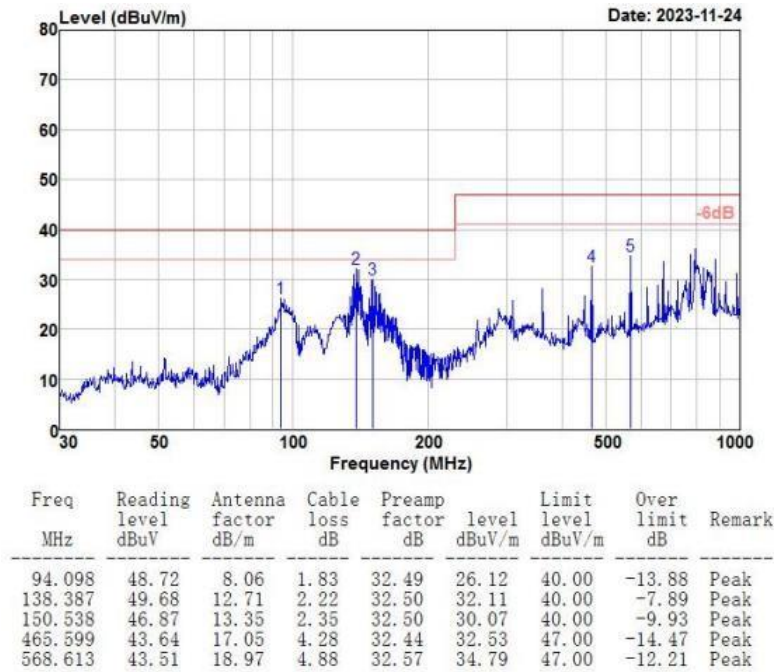
Test standard : 
  EN 61000-4-4:2012 
  IEC 61000-4-4:2012 
  GB/T 17626.4-2018  
 Other:

Test Points		Test Levels(kV)							
		-0.5	+0.5	-1.0	+1.0	-2.0	+2.0	-4.0	+4.0
 Power ports	L					A	A		
	N					A	A		
	Earth	/	/	/	/	/	/	/	/
	L+N					A	A		
	L + Earth	/	/	/	/	/	/	/	/
	N + Earth	/	/	/	/	/	/	/	/
	L+N+Earth	/	/	/	/	/	/	/	/
Signal ports	___/___	/	/	/	/	/	/	/	/

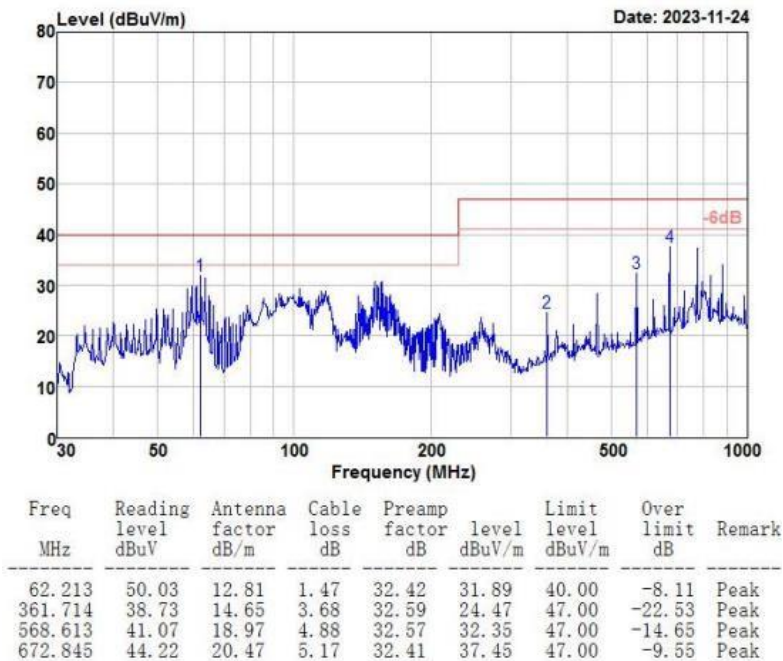
### 3.3 RE test

Test Item	Test Standard	Result
RE	Class B	Normal operation

#### HORIZONTAL



#### VERTICAL



### 3.4 CS test

■ Test standard :  EN 61000-4-6:2014  IEC 61000-4-6:2013  GB/T 17626.6-2017

Other:

■ Modulation:  Amplitude 80%,1kHz sine wave  Amplitude 80%,2Hz sine wave  Other:

■ Dwell time:  1s  3s  other:

■ Frequency Step Size :  1 % of preceding frequency value  other:

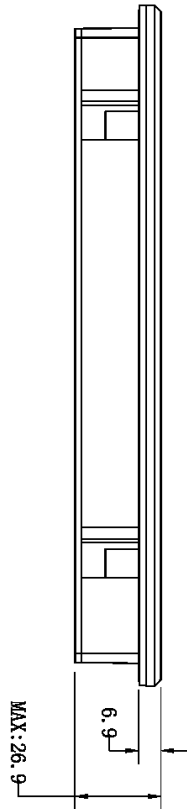
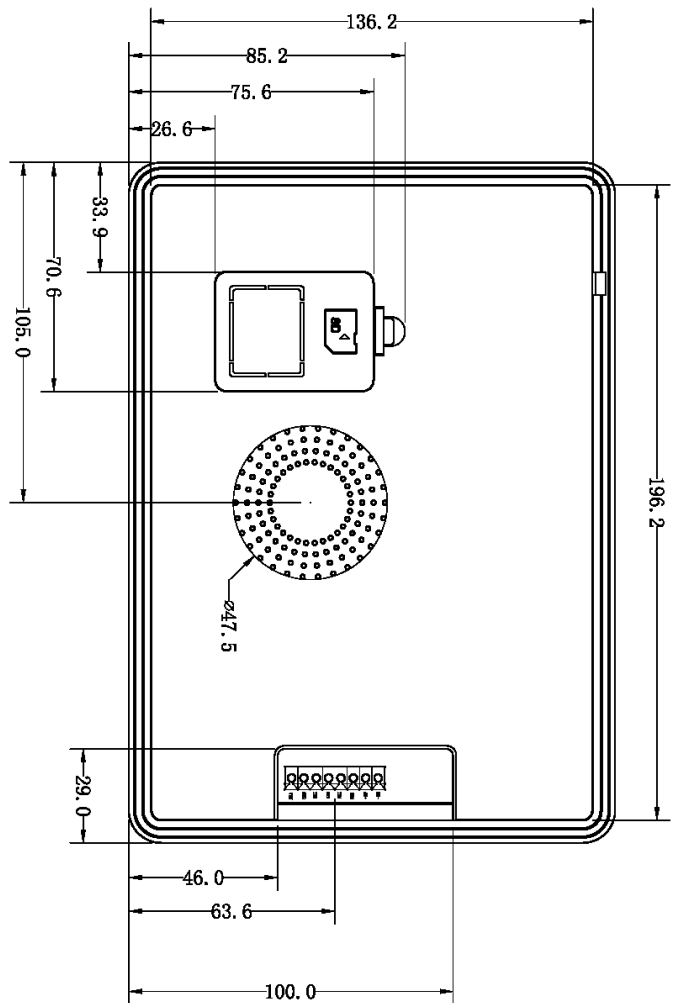
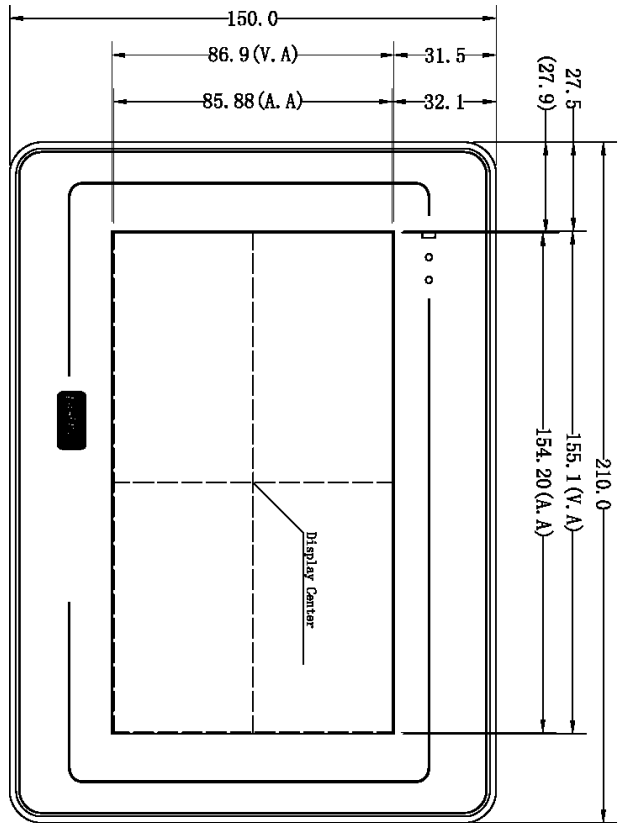
Coupling Line	Frequency Range (MHz)	Voltage Level(e.m.f.) (V)	Result
DC	0.15 ~ 80	10	A

#### Performance Criterion:

- A. Normal performance within limits specified by the manufacturer, requestor or purchaser;
- B. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention;
- C. Temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- D. Loss of function or degradation of performance which is not recoverable, due to damage to hardware or software, or loss of data.

#### 4、Packaging & dimensions

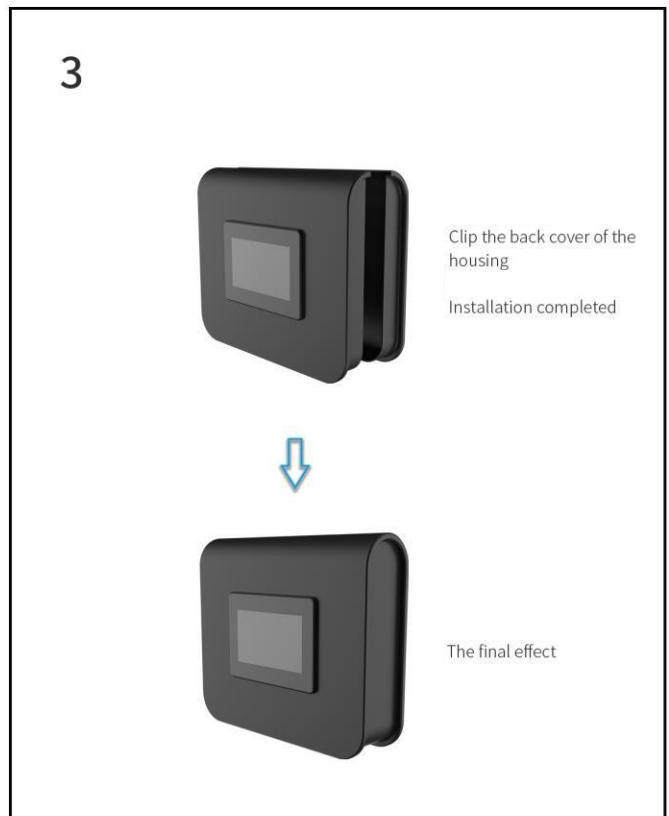
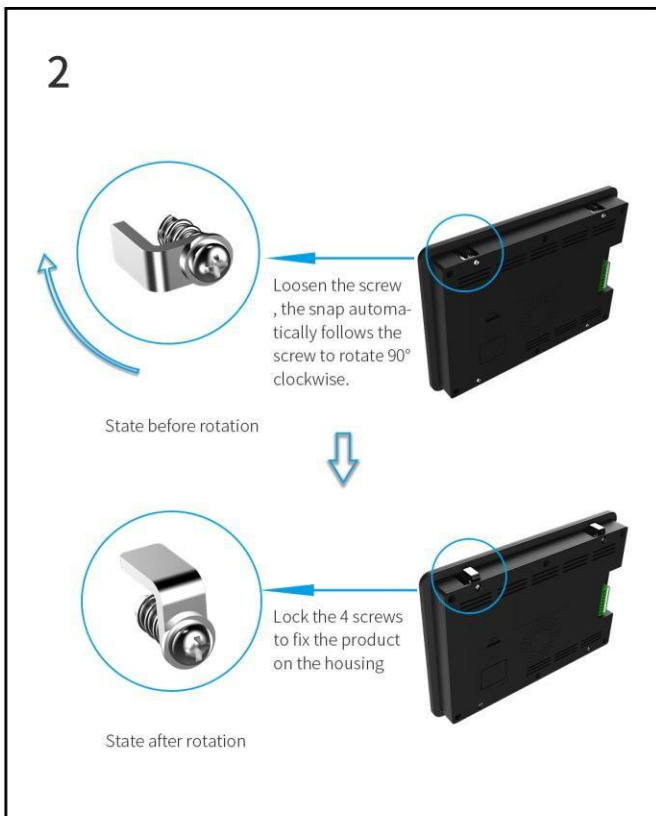
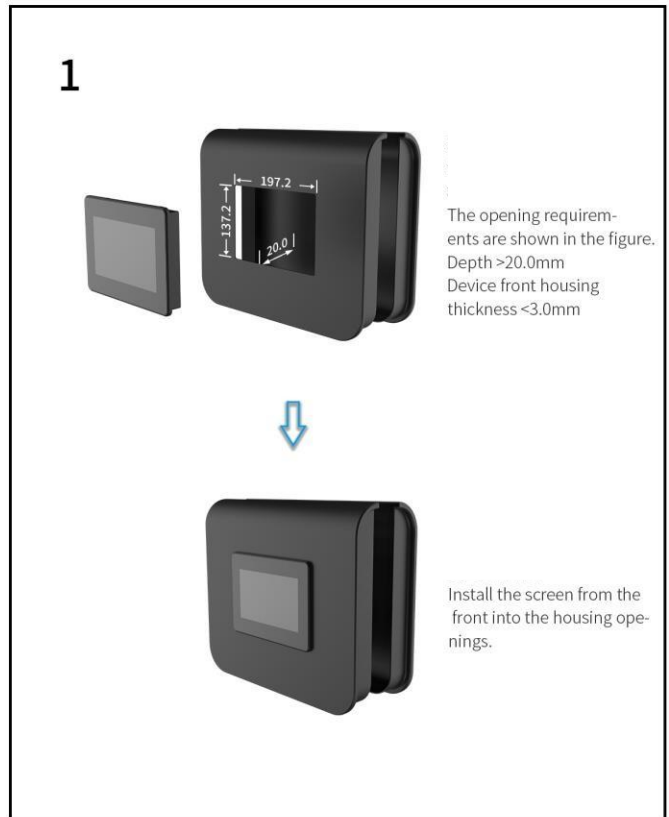
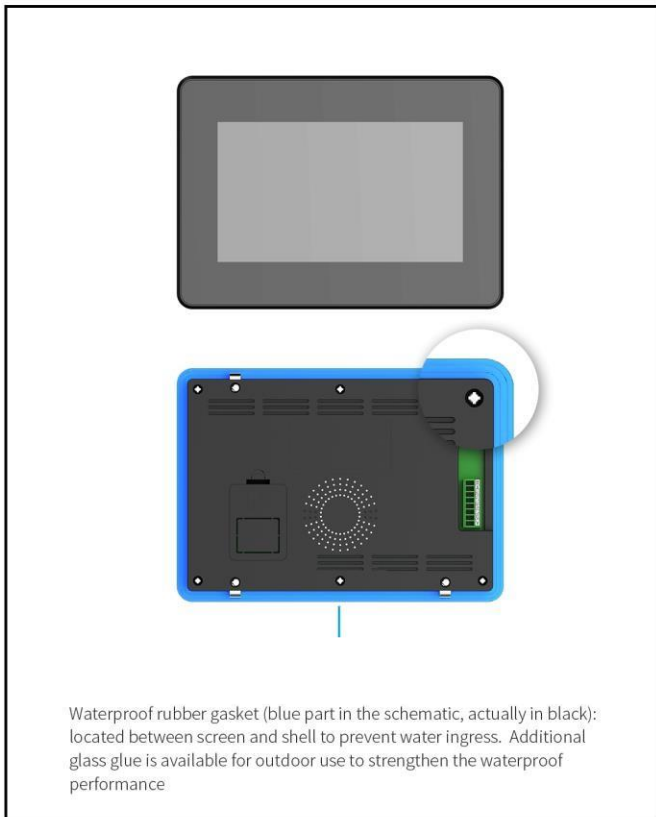
<b>Form Factor</b>	210.0mm (W)×150.0mm (H)×26.9mm (T)			
<b>Net Weight</b>	490g			
Packaging Standards				
<b>Model</b>	<b>Dimensions</b>	<b>Layer</b>	<b>Quantity/Layer</b>	<b>Quantity(Pcs)</b>
1 Carton1:	220mm(L)×160mm(W)×47mm (H)	-	-	-
2 Carton2:	250mm(L)×200mm(W)×80mm (H)	2	1	2
3 Carton3:	320mm(L)×270mm(W)×80mm (H)	-	-	-
4 Carton4:	435mm(L)×335mm(W)×290mm(H)	-	-	-
5 Carton5:	600mm(L)×430mm(W)×290mm(H)	1	20	20



Definition	Pin#	Type	Description
B5-	1	485-	485-
A5+	2	485+	485+
RX4	3	I	
TX4	4	0	DOUT
RX2	5	I	DIN
TX2	6	0	DOUT
GND	7	P	/GND
VIN	8	P	/Power Input

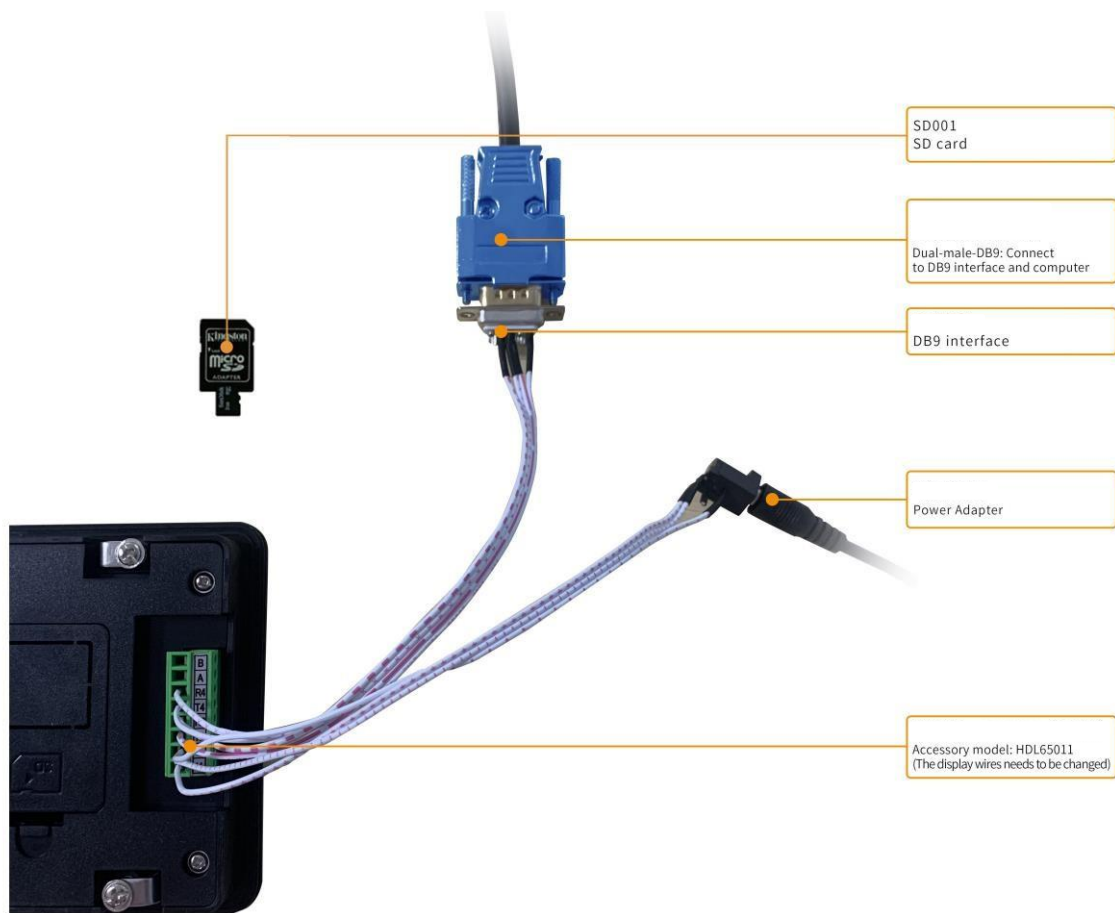
1. Location hole is used as position reference.
  2. Unmarked Tolerance is +/-0.3mm
- Active area is marked in Dash lines

A 4									
MM									



## 5、 Debugging tools

It is recommended for new users smart LCMs to purchase official accessories. For more details, please refer to customer service center.



## 6、 T5L series IC features

(1) 8051, 1T 250MHz。

Mature and stable 8051 core which is the most widely used with the maximum operating frequency of T5L is up to 250MHz, 1T(single instruction cycle)high speed operation.

(2) CPU (GUI CPU) DGUS II:

Separate GUI CPU Core running DGUS II System:

- 2.4GB/S

High-speed display memory, 2.4GB/S bandwidth.

- 2D, JPEG 200fps@1280\*800, UI

2D hardware acceleration, the decompression speed of JPEG is up to 200fps@1280\*800 and the UI with animation and icons as its main feature is extremely cool and smooth.

- JPEG 16Mbytes SPI Flash。

Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.

- 400Hz

Support CTP or RTP with adjustable sensitivity and maximum 400 Hz touch frequency.

- 1 15bit 32Ksps PWM

1-way 15bit 32Ksps PWM digital power amplifier driver loudspeaker, save power amplifier cost and achieve high signal-to-noise ratio and sound quality restoration.

- 128Kbytes OS CPU

128Kbytes variable storage space for exchanging data with OS CPU Core and memory.

- PC

Support DGUS development and simulation on PC. Support background remote upgrade.

(3) CPU (OS CPU) 8051 ,CPU:

Separate CPU (OS CPU) core runs user 8051 code OS system and user CPU is omitted in practical application:

- 8051, 64Kbytes, 32Kbytes RAM。

Standard 8051 architecture and instruction set, 64Kbytes code space, 32Kbytes on-chip RAM.

- 64bit (MDU) , 64bit MAC 64bit

64 bit integer mathematical operation unit (MDU), including 64 bit MAC and 64 bit divider.

- 28 IO, 4 UARTs, 1 CAN 8 12bit A/D, 2 16bit PWM。

28 IOs, 4-channel UARTs, 1-channel CAN, up to 8-channel 12-bit A/Ds and 2-channle 16-bit PWM of adjustable resolution.

- IAP

Support IAP on-line simulation and debugging with unlimited number of breakpoints.

- DGUS

Upgrade code online through DGUS system.

(4) 1Mbytes Flash,

1Mbytes on-chip Flash encryption technology ensure code and data security.

(5)  $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$   $-55^{\circ}\text{C}\sim105^{\circ}\text{C}$ (IC)。

Operating temperature ranges from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ (IC operating temperature customizable from  $-55^{\circ}\text{C}$  to  $105^{\circ}\text{C}$ ).

## 7、 Revision records

Rev	Revise Date	Content	Editor
00	2019-12-26	First Edition	ZK
01	2021-11-04	Upgrade version	
02	2022-01-05	Update RTC accuracy description	
04	2022-11-14	Modify dimension description	
05	2023-12-14	EMC hardware upgrade, natural consumption of old inventory boards	
06	2024-05-27	Add FLASH extension components	
07	2024-08-22	Update interface diagram	
08	2024-08-30	Modify Power Voltage	