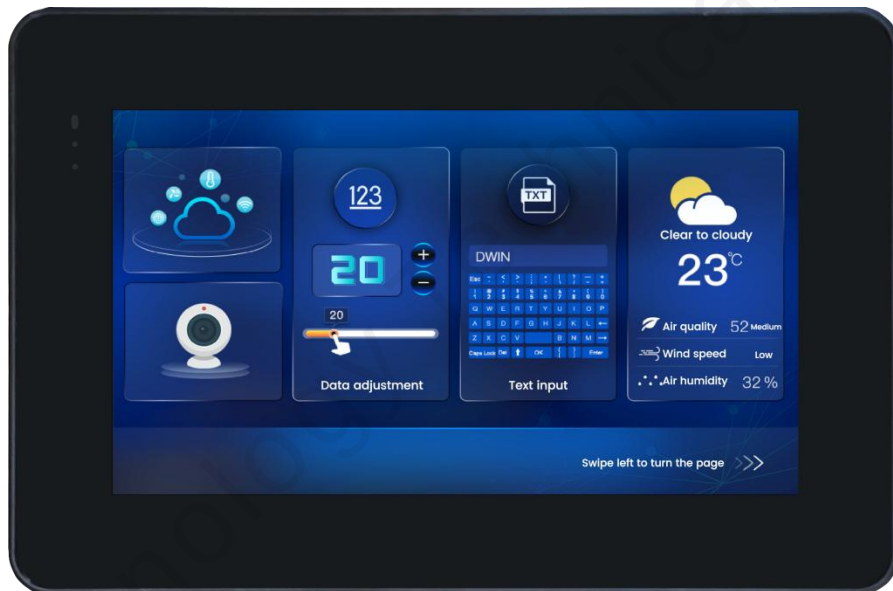


DT322X220034Z240902A

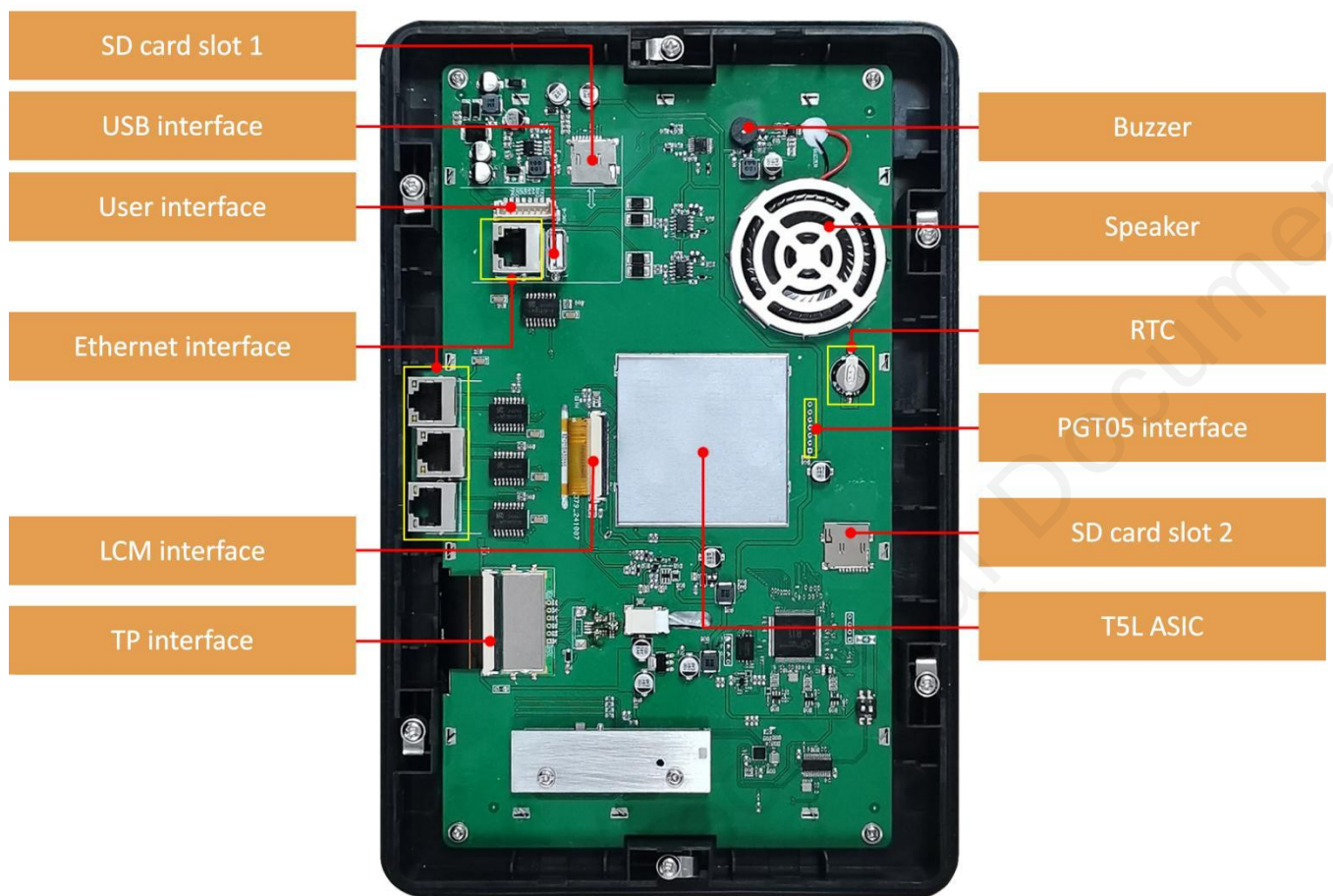
Features:

- Powered by T5L2 ASIC, running DGUS II HMI platform, industrial-grade smart LCM.
- 10.1 inch, 1024*600 resolution, IPS-TFT LCD.
- Capacitive touch panel.
- With enclosure, anti-UV, and conformal coating.



1. Hardware and interface

1.1 Hardware interface diagram



Hardware interface diagram

1.2 Hardware and interface description

No.	Item	Description
1	T5L2 ASIC	DWIN independently developed, mass production in 2019. Dual 8051 cores, GUI and application run on separate 8051 cores.
2	User interface	8Pin_2.0mm socket for power supply and serial communication.
3	Flash	32MBytes (2*16MBytes NOR Flash) for storing UI files like fonts, images, music, with over 100,000 erase/write cycles.
4	Expand Flash pads	Two expansion slots support NOR or NAND Flash(Inside the shield), up to 64MB (4x16MB NOR Flash) or 48MB+512MB (3x16MB NOR Flash + 512MB NAND Flash).
5	Buzzer	3V passive buzzer.
6	Speaker	Onboard speaker. Power: 4Ω 2W.
7	RTC	Super-capacitor powered, accuracy: $\pm 20\text{ppm}$ @25°C, maintains operation for 7 days after power-off.
8	SD card slot 1	For DGUS project file downloads (UI, CFG files, kernel, etc.), 4 Mb/s rate.
9	SD card slot 2	For flashing video module firmware.
10	PGT05 interface	For programming DGUS firmware.
11	Ethernet interface	4 interfaces, support connecting webcam.
12	USB interface	Reserved interface.

2. Specification parameters

2.1 Display parameters

LCD Type	IPS, TFT LCD.
Viewing Angle	Wide viewing angle (85°/85°/85°/85° typical), high contrast, and good color reproduction.
Resolution	1024x600 (support 0°/90°/180°/270°)
Active Area (AA)	222.70 (W)×125.30mm (H)
Viewing Area (VA)	222.70 (W)×125.30mm (H)
Backlight	LED
Backlight Service Life	>30000 hours
Brightness	200nit
Brightness Control	100-level brightness adjustment (Flickering may occur at 1%-30% of max brightness; not recommended for use in this range)

Note: Use dynamic screen saver to prevent afterimages from prolonged fixed page display.

2.2 Touch parameters

Type	Capacitive touch panel.
Structure	G+G structure with tempered glass surface and hardness ≥ 6H.
Light Transmittance	>85%
Life	>20,000H

2.3 Serial interface parameters

Mode	UART2: RS232 UART4: RS485 (Only available after OS configuration) UART5: RS485 (Only available after OS configuration)				
Voltage Level (RXD, TXD)	Test Condition	Min	Typ	Max	Unit
	Output 1, I _{out} = 1mA	-	-5.0	-3.0	V
	Output 0, I _{out} = -1mA	3.0	5.0	-	V
	Input 1, I _{in} = 1mA	-15.0	-5.0	-	V
	Input 0, I _{in} = -1mA	-	5.0	15.0	V
Baud Rate	3150~3225600bps, typical value of 115200bps.				
Voltage Level (V_AB)	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
Baud Rate	3150~921600bps, typical value of 115200bps.				
Data Format	UART2: N81 UART4: N81/E81/O81/N82 ,4 modes (OS configuration) UART5: N81/E81/O81/N82 ,4 modes (OS configuration)				
Interface Cable	8Pin_2.0mm				

2.4 Electrical specifications

Rated Power	<7W	
Operating Voltage	9-36V, typical value of 12V.	
Operating Current	570mA	VCC=12V, max backlight.
	150mA	VCC=12V, backlight off.
Recommended power supply: 12V 1A DC.		

2.5 Operating environment

Operating Temperature	-20℃ to 70℃ (12V @ 60% RH)
Storage Temperature	-30℃ to 80℃
Anti-UV	Yes
Conformal Coating	Yes
Operating Humidity	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: Place the product on the test bench fixture (approximately 15cm in height), and perform contact and air discharge tests on the smart LCM. Observe if any freezing, black or white screen, flickering, or rebooting occurs during the test.

Test conclusion: The product's ESD performance meets GB/T 17626.2 Class B standards.

☒ 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
Screen					B	B		
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Locations	Test Levels							
	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV
Frame					B	B		
USB	/	/	/	/	B	B	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

3.2 EFT test

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

Test process: Place the product flat on the test bench, power the smart LCM through the power supply coupled with an impulse generator. Observe if any reboot, abnormal display, or touch malfunction occurs during the test.

Test conclusion: The product's EFT performance meets GB/T 17626.4 Class B standards.

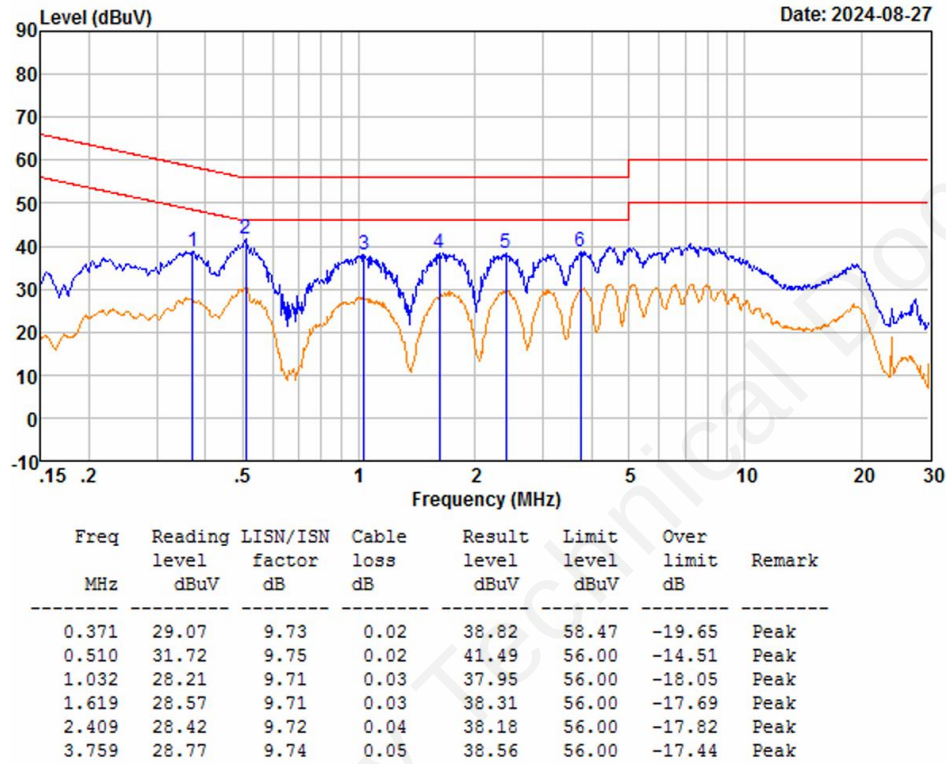
■ Test standard : ☐ EN 61000-4-4:2012 ☐ IEC 61000-4-4:2012 ☐ GB/T 17626.4-2018
☐ Other:

Test Points		Test Levels(kV)							
		-0.5	+0.5	-1.0	+1.0	-2.0	+2.0	-4.0	+4.0
<u>DC</u> Power ports	L					1/2	1/2		
	N					1/2	1/2		
	Earth								
	L+N					1/2	1/2		
	L + Earth								
	N + Earth								
	L+N+Earth								
Signal ports	_____								

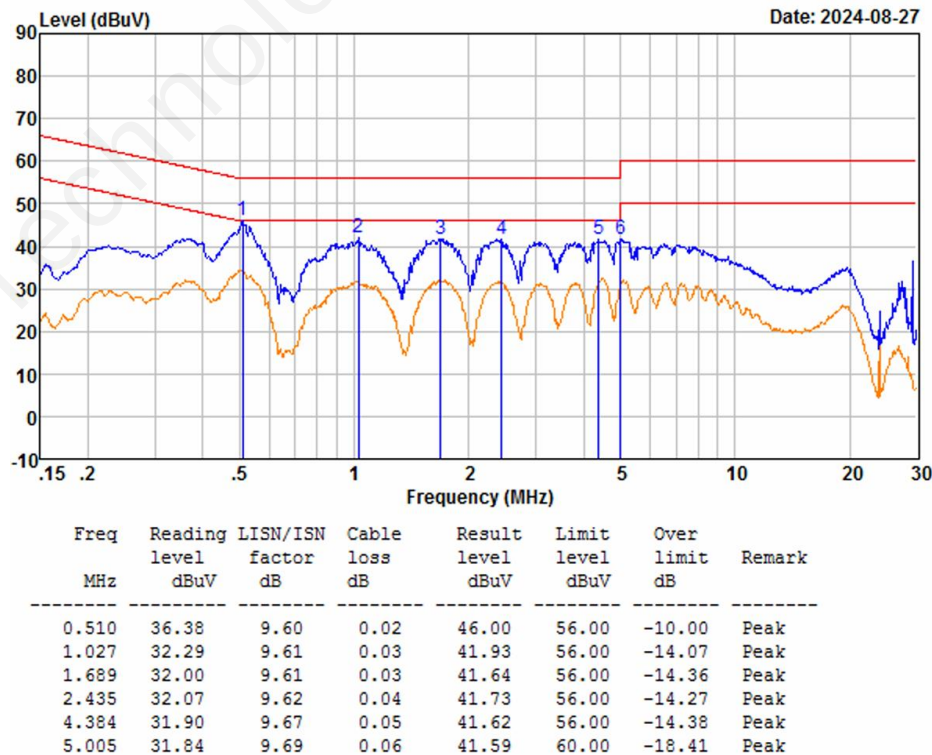
3.3 CE test

Test Item	Test Standard	Result
CE	Class B	Normal operation

LINE



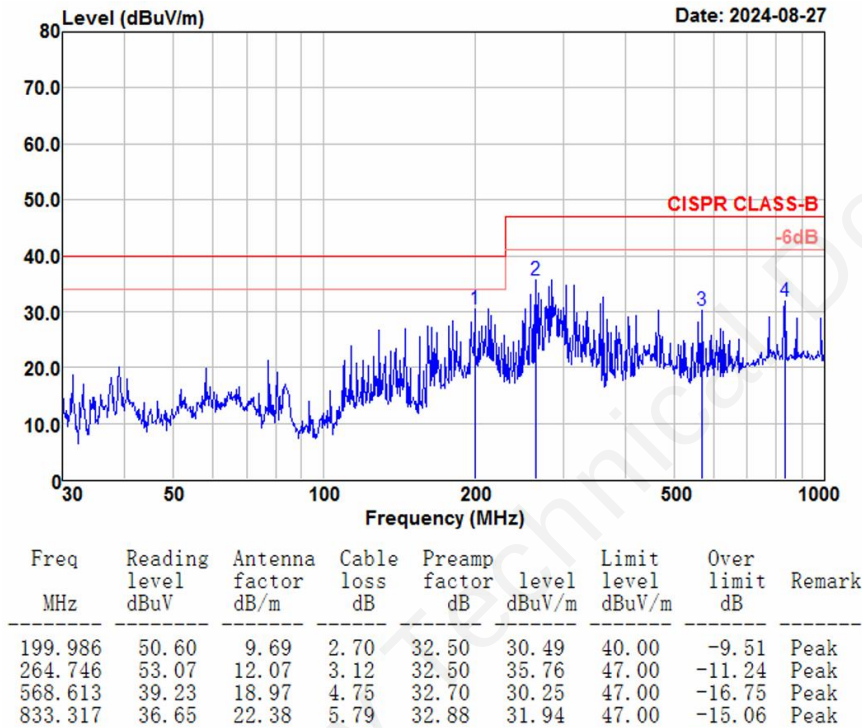
NEUTRAL



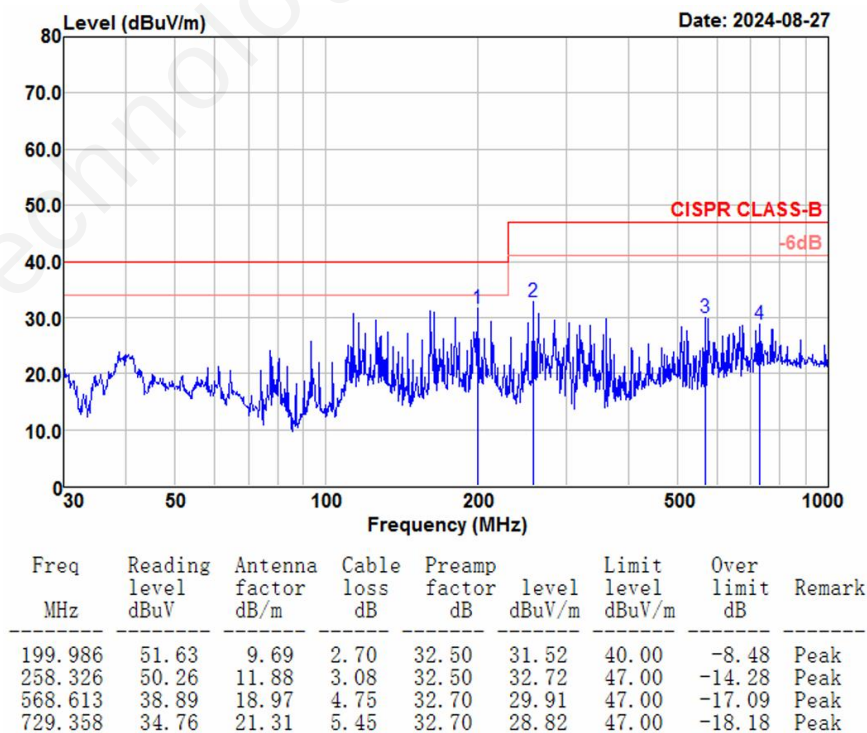
3.4 RE test

Test Item	Test Standard	Result
RE	Class B	Normal operation

HORIZONTAL



VERTICAL



3.5 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:

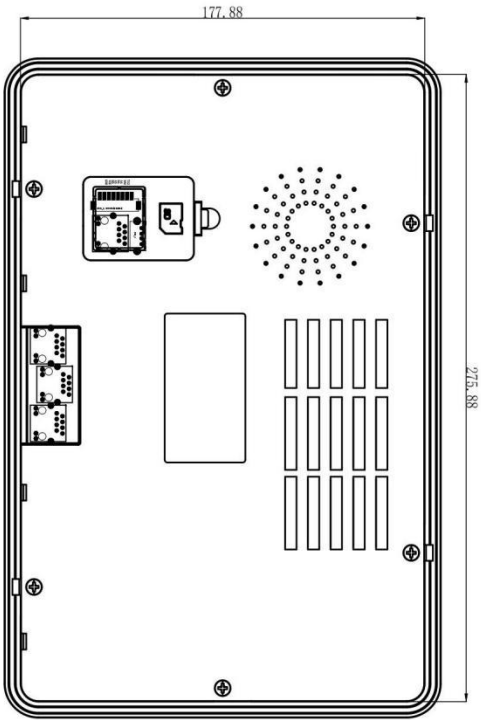
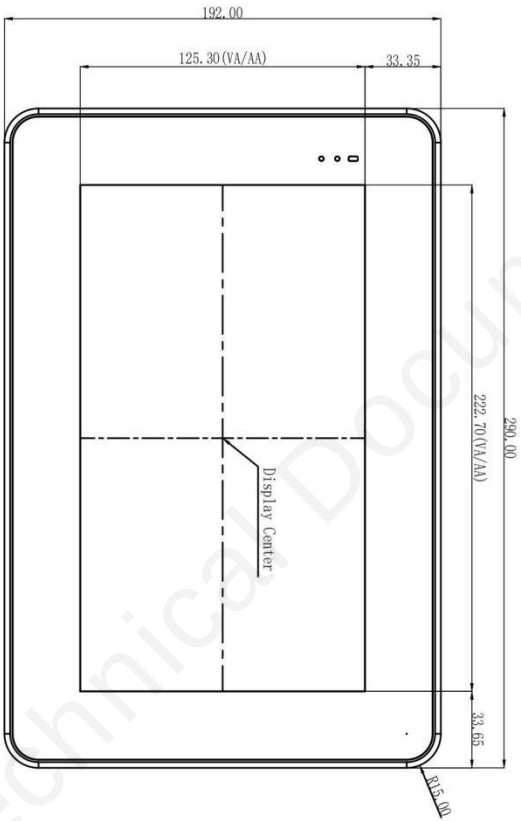
Coupling Line	Frequency Range (MHz)	Voltage Level(e.m.f.) (V)	Result
DC power line	0.15 ~ 80	10	△

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

Form Factor	290.00mm (W)×192.00mm (H) ×29.50mm (T)			
Installation Dimensions	Positioning hole: 275.88 (+0.3mm)×177.88 (+0.3mm)			
Net Weight	1010g			
Packaging Standards				
Model	Dimensions	Layer	Quantity/Layer	Quantity(Pcs)
Carton1:	220mm(L)×160mm(W)×47mm (H)	-	-	-
Carton2:	250mm(L)×200mm(W)×80mm (H)	-	-	-
Carton3:	320mm(L)×270mm(W)×80mm (H)	1	1	1
Carton4:	525mm(L)×330mm(W)×80mm (H)	1	5	5
Carton5:	570mm(L)×340mm(W)×385mm (H)	1	8	8

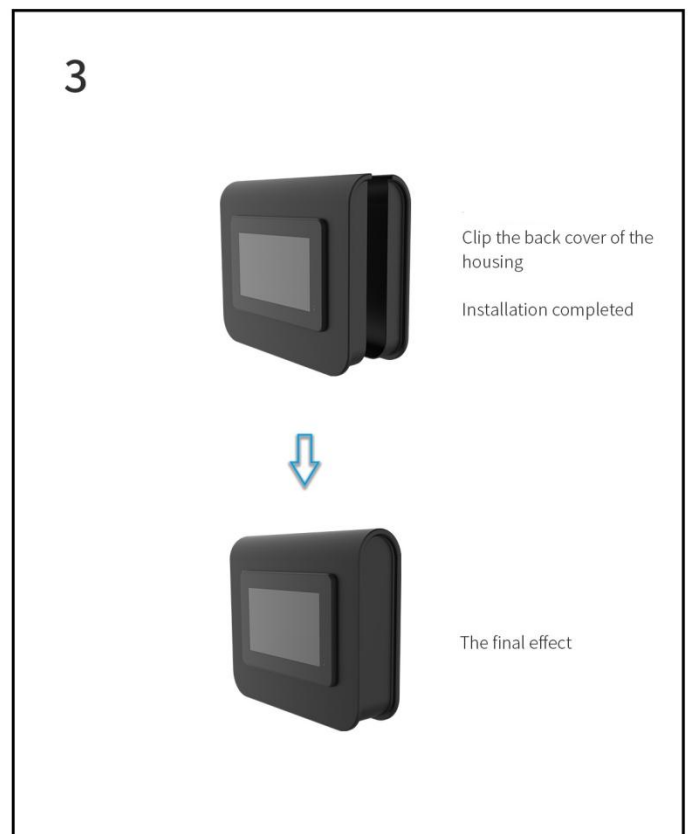
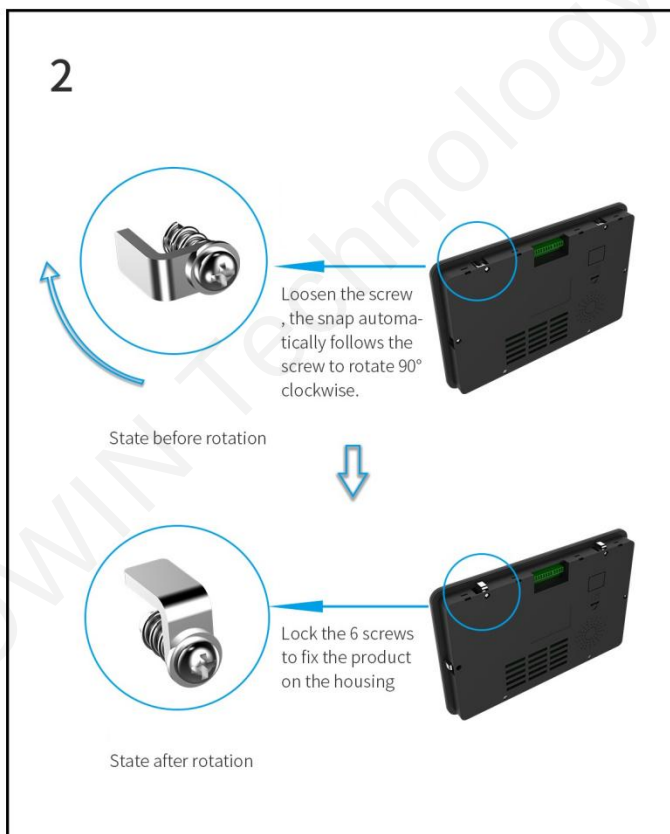
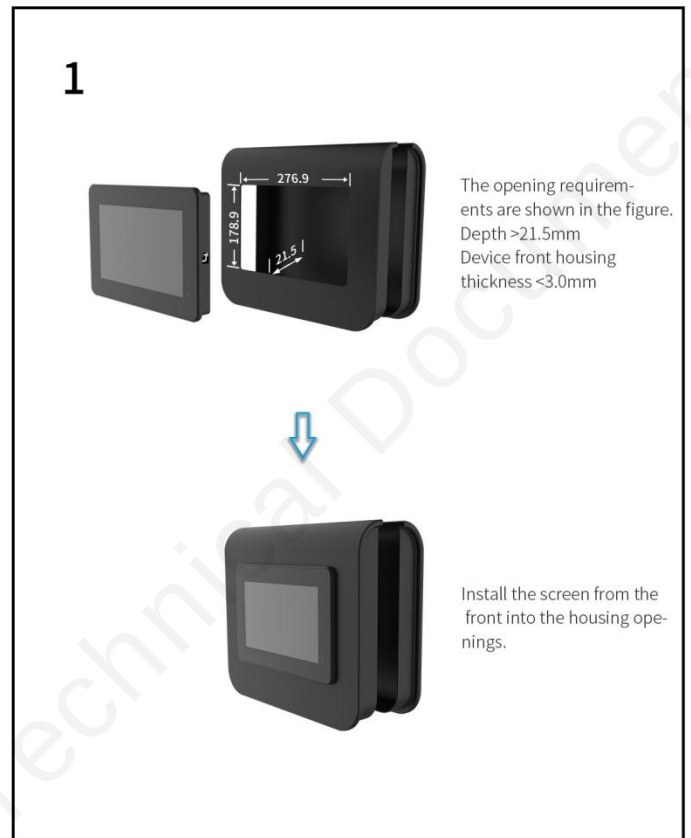
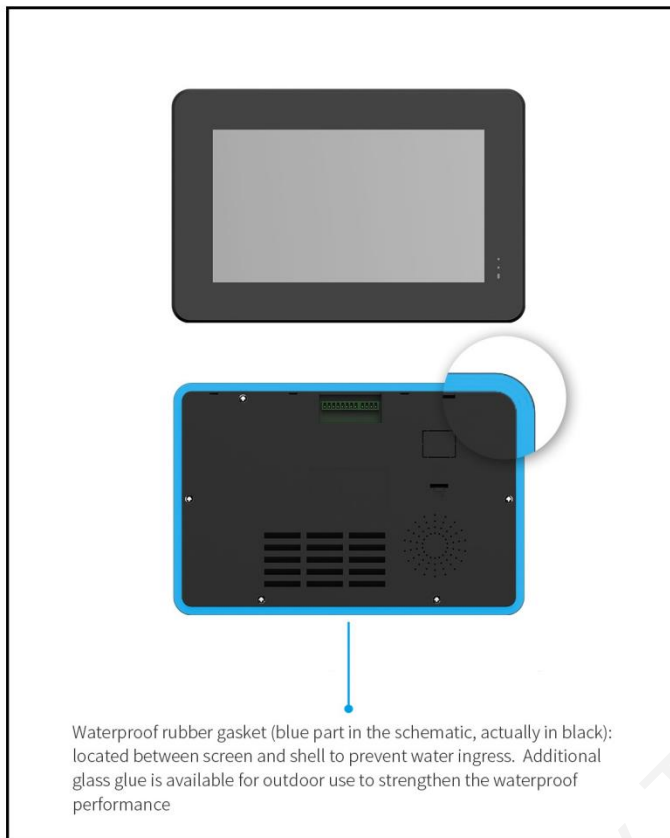


Definition	Pin#	Type	Description
TX2	1	0	UART2 Output
RX2	2	1	UART2 Output
A4	3	A	RS485+
B4	4	B	RS485-
A5	5	A	RS485+
B5	6	B	RS485-
VCC	7	P	电源输入 Power Input
GND	8	P	公共接地 GND

1. Location hole is used as position reference.
2. Unmarked Tolerance is $\pm 0.3\text{mm}$
Note: Active area is marked in Dash lines

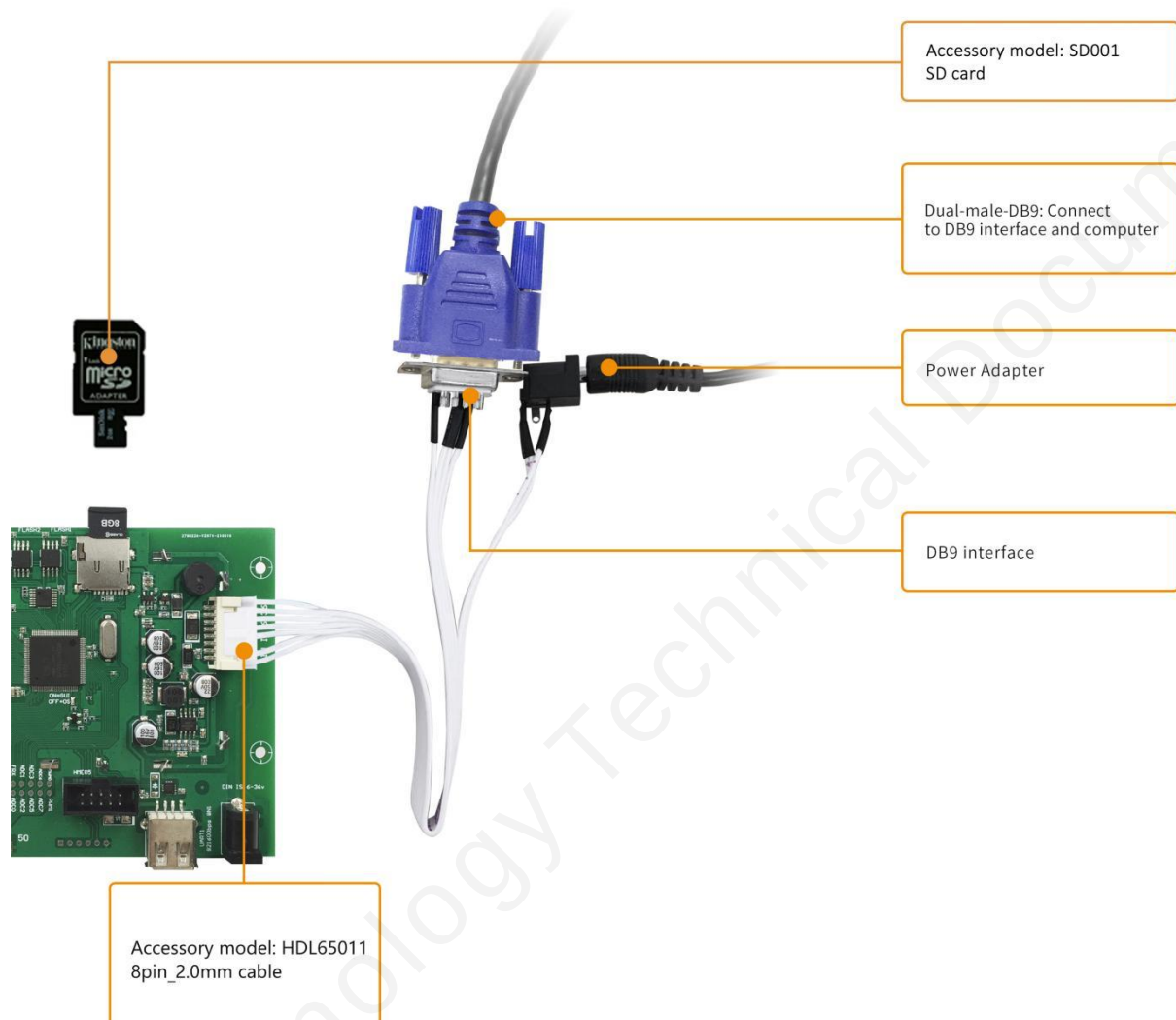
Model	DT322X220034Z240902A				DWIN Technology			
Drawing	A 4	Drawn	G. Y	Date				
Scale	1:1	Review		Date				
Unit	MM	Approval		Date				

Installation Schematic



5. Debug tools

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



6. T5L series IC features

- (1) 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) Separate GUI CPU Core running DGUS II System:
 - High-speed display memory, 2.4GB/S bandwidth.
 - 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.
 - Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.
 - Support CTP or RTP with adjustable sensitivity and maximum 400 Hz touch frequency.
 - 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 variable storage space for exchanging data with OS CPU Core and memory.
 - Support DGUS development and simulation on PC. Support background remote upgrade.
- (3) Separate CPU (OS CPU) core runs user 8051 code or DWIN OS system and user CPU is omitted in practical application:
 - Standard 8051 architecture and instruction set, 64Kbytes code space, 32Kbytes on-chip RAM.
 - 64 bit integer mathematical operation unit (MDU), including 64 bit MAC and 64 bit divider.
 - 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.
 - Support IAP on-line simulation and debugging with unlimited number of breakpoints.
 - Upgrade code online through DGUS system.
- (4) 1Mbytes on-chip Flash with DWIN patent encryption technology ensure code and data security.
- (5) Operating temperature ranges from -40°C to +85°C(IC operating temperature customizable from -55°C to 105°C).

DWIN encourages users to design your own customized product based on T5L

7. Revision records

Rev	Revise Date	Content	Editor
00	2024-10-25	First Edition	Xu Ying

Please contact us if you have any questions about the use of this document or our products, or if you would like to know the latest information about our products:

- Customer service Tel: +86 400 018 9008
- Customer service email: dwinhmi@dwin.com.cn
- DWIN Developer Forum: <https://forums.dwin-global.com/>

Thank you all for continuous support of DWIN, and your approval is the driving force of our progress!

Important Disclaimer

DWIN reserves the right to make any changes to product designs without prior notice.

Customers should ensure strictly adhering to all the relevant standards and requirements during the product application process, including but not limited to functional safety, information security, and regulatory provisions.

DWIN shall not bear any joint and several liability for any consequences that may arise from customers' adoption of DWIN products. In particular, for risks that may lead to significant property losses, environmental hazards, personal injury, or even death, especially in high-risk application areas such as military applications, flammable and explosive places, and life-saving medical equipment, customers should independently assess the risks and take corresponding preventive and protective measures. DWIN shall not bear any relevant responsibility.