

Contents in this document may change without prior notice.
Please obtain the delivery specification for the final design.



21.5" Wide (FHD)

Projected capacitive Touchscreen Module with LCD

Basic Set

TK-B Series

Model: TK-BPA215FH-12A3

Product Specification

DMC Co., Ltd.

<https://www.dush.co.jp/english/>

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- Outline Drawing (SM3-002523-10)
- Appearance inspection standard
(LCD Modules with Capacitive Glass Sensor Touchscreen) (22G4GX-00002E)

Downloads : <https://www.dush.co.jp/english/download/>

- Glass/Glass Structure Projected Capacitive Touch Screen, Mounting Guidance
(DUS-N-series)
- Touch Screen Controller Specification: DUS3200 Product Specification

1 Summary

This is a “TK series Basic Set” with 21.5" Wide projected capacitive touchscreen sensor, controller, LCD(Liquid Crystal Display), and HDMI board put together in a sheet metal chassis.

2 Product Model

Model	Specification			
	LCD size (Resolution)	Touchscreen Type	Bonding method	Set Type
TK-BPA215FH-12A3	21.5" Wide (FHD)	Projected capacitive	Air-bonding *1	Basic Set

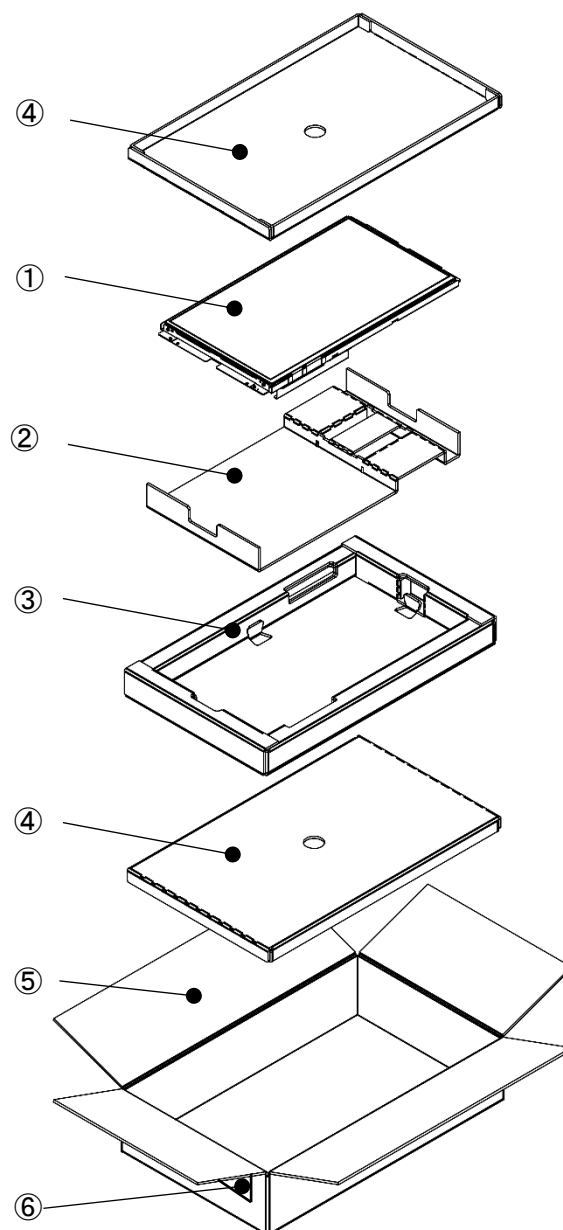
*1. Bonding of LCD and touchscreen with double-sided tape.

3 Packaging Specification

Contents	Specification	Size (W x D x H) mm
TK-BPA215FH-12A3	Individual Packaging (1unit/box)	External Dimension: 640 x 400 x 159

▪ Individual Packaging Configuration

No.	Name	Qty
①	TK-BPA215FH-12A3 (placed inside anti-static bag)	1
②	Pad	1
③	Center Pad	1
④	Top/Bottom Pad	2
⑤	Outer box	1
⑥	Packaging label	1



4 Module Specification

4-1 Function

Item			Specification	units
LCD	Display device		21.5" Wide TFT LCD	-
	Display area (Active area)		476.064(W) × 267.786(H)	mm
	Pixels		1920(W) × 1080(H)	-
	Pixel pitch		0.248(W) × 0.248(H)	mm
	Color		16.7M	colors
	Brightness (Typ.)		350	cd/m ²
	View angle (Typ.)	Vertical (Upper/Lower)	89 / 89	deg.
		Horizontal (Left/Right)	89 / 89	
	Interface		LVDS	-
	Backlight method		LED, with backlight driver	-
	Backlight life *1		Min. 50,000	hours
Touchscreen	Touchscreen type		Projected Capacitive	-
	Input method		Finger	-
	Maximum simultaneous input point		5 points	-
	Operating life(Continuous Typing)		50 million times(finger input)	-
	Communication Method		USB 2.0	-
	Supporting OS		*2	-
HDMI board	Input image port		HDMI (does not support HDCP)	-
	Input Signal	Digital	HDMI 1.3b	-
		Horizontal scan cycle	30K - 80K	Hz
		Vertical scan cycle	50 - 60	Hz

*1. Time until the backlight brightness declines by 50% from the initial value when continuously turned on at maximum brightness at the ambient temperature of 25°C.

*2. Please refer to the "Touchscreen Controller OS Compatibility Table".

(<https://www.dush.co.jp/english/download/driver-app/>) (Touchscreen controller referenced: DUSx200)

4-2 General Specification

Item		Specification
Power	Input power voltage	12VDC
	Voltage tolerance	12VDC±5%
	Power consumption	Max. 26.0W

Note: If the capacity of the power supply used is large, the drop in voltage when it is turned off will be gradual. When restarting, please turn on the power again after the power supply voltage becomes 0V.

4-3 Environment

Item	Specification
Ambient operating temperature (Inside cabinet and display side)	0°C to 55°C
Ambient storage temperature	-20°C to 60°C
Ambient operating humidity	10%RH to 85%RH (Non-condensing. Wet-bulb temperature is 39 °C or less)
Ambient storage humidity	10%RH to 85%RH (Non-condensing. Wet-bulb temperature is 39 °C or less)
Dust	0.1mg/m ³ or under (Conductive dust is prohibited)
Corrosive Gas	Corrosive gas is prohibited
Pollution Degree	Pollution Degree 2, for indoor use

4-4 Mechanical Specification

Item	Specification
Mass	Approx. 4275 g
External dimensions (excluding protruding parts)	530(W)×297(H)×49.6(D) mm

4-5 Touchscreen Controller

For details, please refer to the downloadable document "Touch Screen Controller Specification : DUS3200 Product Specification" in the table of contents.

4-6 Touchscreen Driver

To obtain the touchscreen driver (DMT-DD), please download it from the following site.

URL: <https://www.dush.co.jp/english/download/driver-app/>

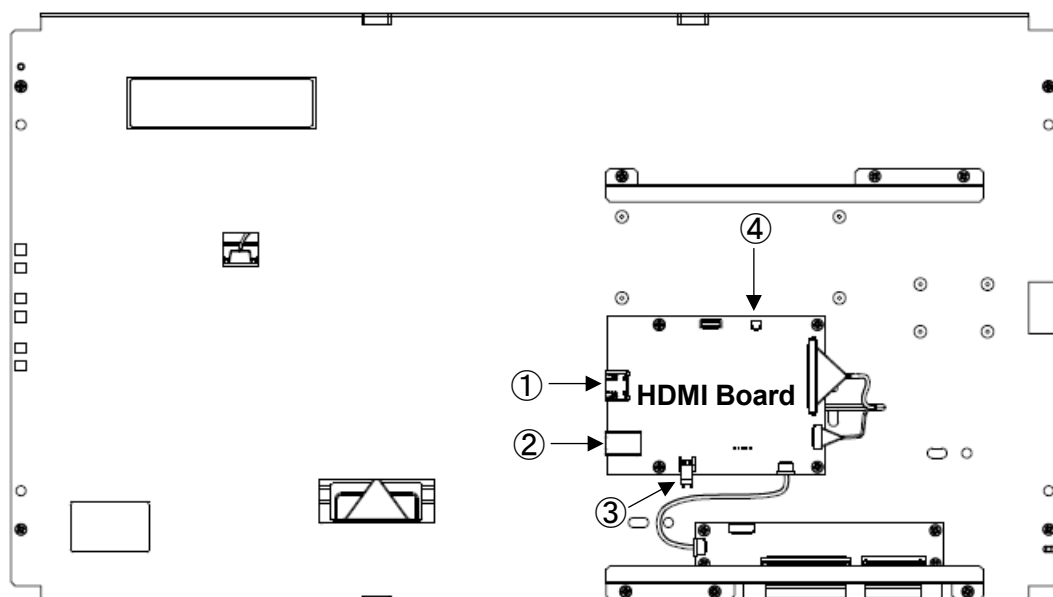
For DMT-DD installing directions, please refer to the User's Guide included in the downloaded files.

4-7 HDMI Board

4-7-1 Support Timing

No	Resolution	Aspect Ratio	Refresh Rate
1	640×480p	4: 3	60Hz
2	720×480p	4: 3	60Hz
3	800×600p	4: 3	56Hz
4	800×600p	4: 3	60Hz
5	1024×768p	4: 3	60Hz
6	1280×720p	16: 9	60Hz
7	1280×960p	4: 3	60Hz
8	1280×1024p	5: 4	60Hz
9	1600×900p	16: 9	60Hz
10	1600×1200p	4: 3	60Hz
11	1680×1050p	16: 10	60Hz
12	1920×1080p	16: 9	60Hz

4-7-2 Part Names (HDMI Board)



No.	Interface Name
①	Image input (HDMI)
②	Touchscreen control USB (USB 3.0 Type-B) *1
③	12VDC Power input (Nylon connector)
④	Pilot lamp LED control

*1 USB2.0 Type-B can be connected.

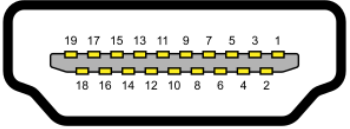
Note: Use of other connectors not listed is prohibited. These are only internal adjustments for the manufacturer and may be excluded without prior notice.

4-7-3 Image Input (HDMI) I/F

Connector No.: CN7

Interface: HDMI Type A

Note: HDMI standard compliant

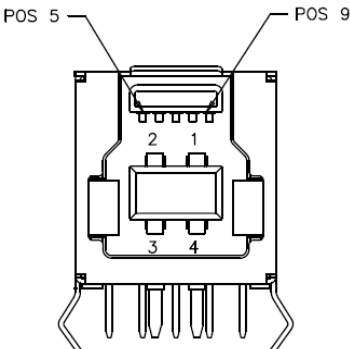
PIN No	Signal Name	PIN No	Signal Name	Schematic Diagram
1	TMDS Data2+	11	TMDS Clock Shield	
2	TMDS Data2 Shield	12	TMDS Clock-	
3	TMDS Data2-	13	CEC (NC)	
4	TMDS Data1+	14	Reserved	
5	TMDS Data1 Shield	15	DDC Clock	
6	TMDS Data1-	16	DDC Data	
7	TMDS Data0+	17	DDC GND	
8	TMDS Data0 Shield	18	+5V Power	
9	TMDS Data0-	19	Hot Plug Detect	
10	TMDS Clock+	-	-	

4-7-4 Touchscreen Control USB I/F

Connector No.: CN4

Interface: USB3.0

Connector: USB3.0 Type-B

PIN No.	Signal Name	Description	Schematic Diagram
1	VBUS (5V)	Power	 <p>View from connector inserting side</p>
2	D-	USB 2.0	
3	D+		
4	GND	GND for power return	
5	StdB_SSTX-	SuperSpeed transmitter	
6	StdB_SSTX+		
7	GND_DRAIN	GND for signal return	
8	StdB_SSRX-	SuperSpeed receiver	
9	StdB_SSRX+		
10	Shield		

* USB port for touchscreen control (can be connected to USB2.0 Type-B).

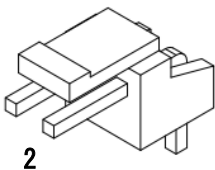
4-7-5 12VDC Power Input I/F

Connector No.: CN1

Interface: +12VDC Input

Connector: A3963WR2-2P(JWT)

Note: Equivalent to S2P-VH(JST)

PIN No.	Signal Name	Schematic Diagram
1	+12V	
2	GND	

4-7-6 Pilot Lamp LED Control I/F

Connector No.: CN10

Connector: 1010-SMTR-03P(JWT)

Note: Equivalent to SM03B-SRSS-TBT (JST)

PIN No.	Signal Name
1	LED_G
2	GND
3	LED_R

Note: Power supply 3.3V, limiting resistance 220Ω (board built-in)

4-7-7 Pilot Lamp LED

By preparing a LED board (refer to following circuit board diagram), the power of the HDMI board and the status of the image input signal can be indicated by LED.

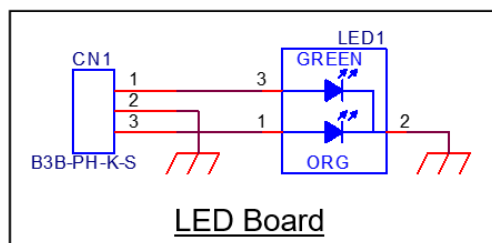
• Status Indicating LED (Example)

Green light up: Power ON, with image input signal

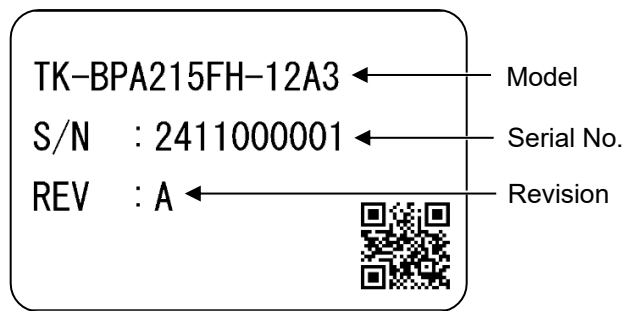
Orange light up: Power ON, without image input signal.

LED off: Power OFF

• Circuit diagram (Example)



5 Product Label



Above is an image example of the product label.

Below information will be indicated on the actual product.

- Model: Product Model
- Serial No.: 10 digit control number
- Revision: Alphabets (A to Z) according to the product revision

6 Compliant Standards

6-1 RoHS

Compliant with EU RoHS directives.

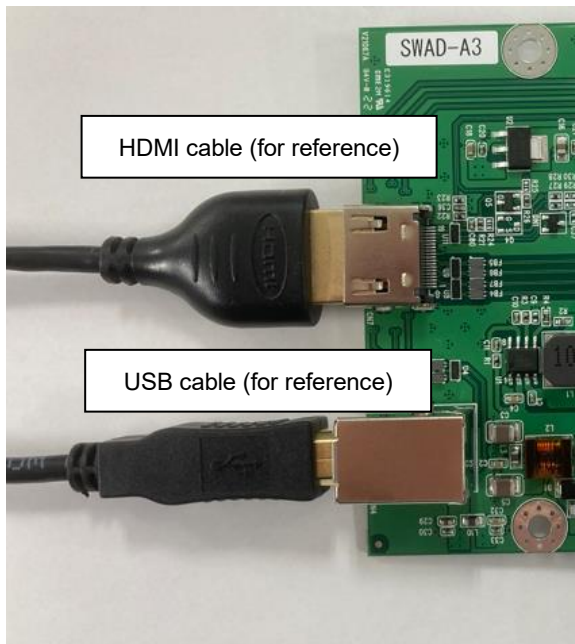
7 Appearance inspection standard

Please refer to “Appearance inspection standard(LCD Modules with Capacitive Glass Sensor Touchscreen)” (22G4GX-00002E) for standards.

8 Connecting Method

8-1 Connecting Each Cable to User I/F of HDMI Board

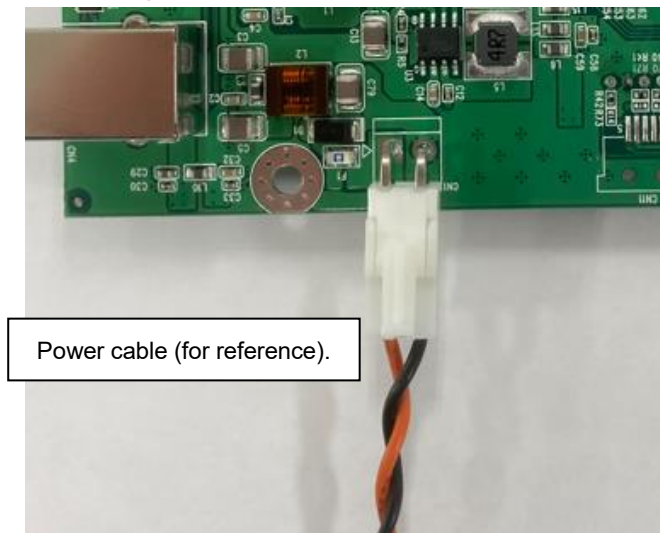
(1) Connecting the HDMI cable and the USB cable.



* Please insert securely.

* HDMI cable/ USB cable not included.

(2) Connecting the Power cable.



* Please insert securely.

* Power cable not included.

9 Touchscreen Calibration

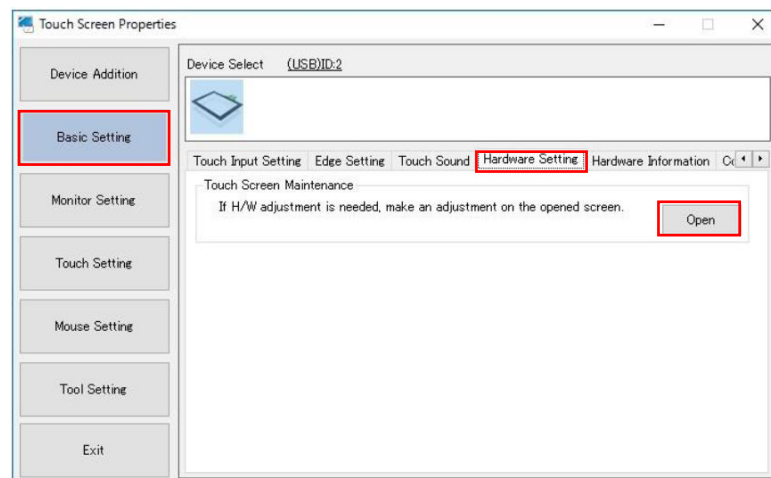
Touchscreen operations may become unstable depending on the installation environment due to its characteristics. To use it correctly, please perform calibration when building into a device.

Install DMT-DD from "[4.6. Touchscreen Driver](#)" when calibrating.

9-1 Projected Capacitive Touchscreen

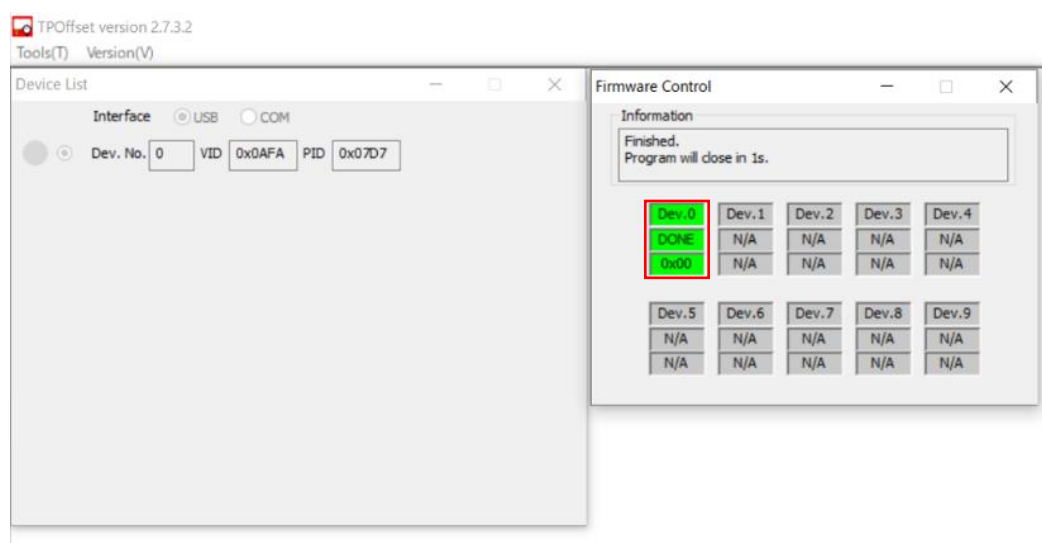
[TPOffset] ...Sensitivity calibration.

- (1) Start [DMT-DD].
- (2) Click [Basic Setting] > Click [Hardware Setting] > Click [Open] of the [Touch Screen Maintenance].



- (1) Sensitivity calibration is complete when [Dev.0] [DONE] [0x00] parts of the other window [Firmware Control] turn green as shown in the following picture.

Maintenance Tool Screen (Example)



- * [Setup Tool] cannot be operated while the [Maintenance Tool] is running.
- * Please do not touch the touchscreen when calibration is being performed.
- * This tool will automatically terminate after the calibration is completed.

10 Terms of Use

10-1 Installing Module

- (1) GND should be taken at the chassis mounting holes, etc., to stabilize brightness and display.
- (2) Install the module so that no external pressure is applied to the LSI mounting area.
- (3) Make sure there are no warping and twisting when installing.
- (4) Make sure the specified temperature and humidity between the module and other structures or parts are taken into consideration to secure ventilation.
- (5) Take anti-static measures such as wearing earthing bands for grounding during assembly.
- (6) To prevent malfunction or damage, make sure the connectors of the connecting cables are inserted securely.

10-2 Precautions for Use of LCD

- (1) The LCD contains irritants inside. If by any chance the liquid should flow out due to damage and come in contact with the skin, wash immediately under running water for more than 15 minutes and consult a physician.
- (2) LCD may have uneven brightness depending on the contents displayed. Please note that this is not a malfunction.
- (3) LCD elements may have spots (black spots/ bright spots). This is a characteristic of the LCD and not a malfunction.
- (4) When the screen is viewed outside the viewing angle, the color displayed may appear to change. This is a basic characteristic of the LCD and not a malfunction.
- (5) When the same image is displayed for a certain long period of time, the image may remain as an afterimage. This is a basic characteristic of the LCD.
In order to avoid afterimages, use a screensaver or other similar functions to periodically change the displayed image and avoid displaying the same image for a long period of time.

10-3 Precautions for Projected Capacitive Touchscreen

- (1) If there are changes in the ambient environment or some elements that change electric fields (capacitors with large capacity, power units, and materials with high permittivity such as metals) are close to the product, they might affect the coordinate detection. Make sure to keep a good distance from the above unstable elements as much as possible when designing.
- (2) Due to the characteristics of the touchscreen, its functions might become unstable according to the environment where it is installed. For correct operations, perform sensor sensitivity calibration of the touchscreen when building it into equipment. Also if at any time the touchscreen operation becomes unstable due to changes in the installation environment or installation conditions, perform the sensitivity calibration.
- (3) The touchscreen surface is made of glass. Glass becomes easy to break if scratched. Please handle it with care and avoid glass from hitting other glass and hard objects.
- (4) Touchscreen may malfunction when there is moisture on the touchscreen surface. When moisture is on the touchscreen surface, please wipe it to dry before use.
- (5) Due to the characteristics of the touchscreen, a position slightly outside the displayed area might be recognized as a coordinate position. Please give adequate consideration to it and design applications.

- (6) Be careful when handling the end face of the glass as operators easily get injured.

10-4 Precautions for Static Electricity

- (1) Static Electricity may cause damage. Please take sufficient measurements when handling.
- (2) Operators handling the product should take antistatic measures. Wearing grounding bands, etc. is recommended.

10-5 Operating Precautions

- (1) When used outside the specification standards, it may significantly affect the product quality and service life, such as degradation of display quality and generation of air bubbles. Please be sure to use it within the standards.
- (2) An acoustic noise may be generated from the components on the board, but this is not a malfunction. The sound pressure is less than 40 dB (Measurement distance: 30 cm) and is not considered to be a problem when using the product.
*40 dB = Quiet residential area (Daytime) / Inside a library

10-6 Storing Precautions

- (1) When storing the module, please avoid areas of high temperature and humidity. Especially when storing for a long period of time, make sure to store it in a place that is not exposed to direct sunlight and/or fluorescent lighting.
- (2) Please store the module in a condition where it is not subject to excessive load.

10-7 Handling Precautions

- (1) Do not leave the product in an environment with high temperatures for a prolonged period. Make sure to avoid high humidity especially when the temperature is above 40°C. Failing to do so may cause polarizing plate deterioration, peeling, and/or bubbles to form.
- (2) If the surface of the polarizing plate becomes dirty, wipe it lightly with a soft material such as cotton cloth moistened with a small amount of ethyl alcohol.
- (3) Condensation on the polarizing plate during testing is prohibited to prevent staining, discoloration, or forming spots on the plate.
- (4) Disassembling the module and/or changing the volume of the module are prohibited. Doing so may cause malfunction and failure to perform correctly.
- (5) This product is intended for use in general electronic equipment and is not intended for use in special environments such as a corrosive gas atmosphere. If use in a special environment is anticipated, please evaluate thoroughly or take precautions not to expose the LCD to corrosive gases, etc.
- (6) This product is intended for use in standard applications (office equipment, industrial, communication, household equipment, etc.). Do not use the products for special applications that require extremely high reliability (e.g., aerospace, nuclear power control, medical applications for life support, etc.) or where malfunctions or failures may directly cause injuries to the human body.
- (7) Do not rub or press the product with hard or sharp objects.
- (8) Keep away from flames/fire.
- (9) Avoid wiping the product with excessive pressure.
- (10) Avoid locally rubbing the product with strong pressure. It may cause damage to the function of the touchscreen.

- (11) When operating the product, please avoid striking it with a hard object.
- (12) Do not forcibly fold or bend the product
- (13) When storing the product, use the packing box and keep the product within the specified storage temperature and humidity and in an environment where it is free of excessive pressure and loads.
- (14) Avoid using and storing the product where it can be exposed to or come in contact with liquids, organic solvents, and an acidic atmosphere.
- (15) Avoid using the product in direct sunlight.
- (16) Do not pull off or disassemble the product.
- (17) When handling the product, hold the main unit and not the touchscreen FPC (tail).
- (18) EMC (EMS, EMI) evaluation is not conducted at shipment. Please conduct an overall evaluation and confirmation after the product has been installed in your equipment.

11 Warranty

The warranty period is limited to 12 months (1 year) from the date of shipment. Any defects that occur upon normal use under conditions specified herein will be repaired (factory repair) free of charge. (Warranty for any repair needed to the same repaired part of the same product is three months.)

You will be liable for all repair fees even within the warranty period for any conditions listed below.

- (1) Any malfunctions, defects, and/or damage that occurred during transport, transfer, or mishandling by the user after delivery.
- (2) Any malfunctions, defects, and/or damage caused by natural or man-made disasters.
- (3) If the product is used under any condition, environment, or method other than those specified in the specifications, catalogs, manuals, notes, and/or other documents.
- (4) Any malfunctions, defects, and/or damage caused by connected equipment and/or usage of inappropriate consumables and media.
- (5) If the product is repaired, remodeled, modified, or disassembled by a party other than DMC Co., Ltd, or if a serial number label cannot be verified.
- (6) Any failure, damage, or malfunction is deemed to be caused on your behalf.

This warranty covers only the product itself. No warranty is provided for damage, on-site repair, or replacement resulting from product failure.

12 Production Discontinuance

In the event of production discontinuance, an announcement will be made six months prior to the last possible order reception date.

13 Other

For comments or queries, feel free to contact us.

North South America area

technical-global@dush.co.jp

Asia Pacific area

technical-global-asia@dush.co.jp

Europe, Middle East, Africa area

technical-global-eu@dush.co.jp

FAQ

<https://www.dush.co.jp/english/support/faq/>

1st Edition, January 2025

DMC Co., Ltd.

Business hours: 9:00a.m.~5:00p.m. (JST)

URL: <https://www.dush.co.jp/english/>

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Appearance inspection standard

LCD Modules with Capacitive Glass Sensor Touchscreen

Document No.	22G4GX-00002E		Page (Cover Excluded)	2
Revision history				
Revision	Date	Person in charge	Page	Description
0	2023/3/10	Imada	—	Initial Preliminary

Appearance inspection standard (1)

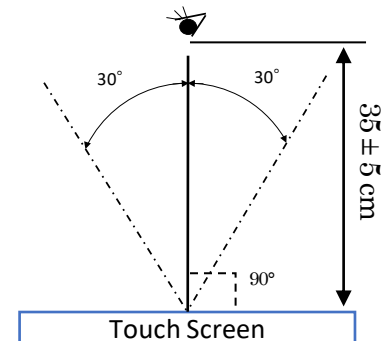
1.1 Inspection condition

Inspection Distance : 35 ± 5 cm

View Angle : Inspection under non-operating condition : $\pm 30^\circ$

Ambient Illumination : 500~2000 lux

Inspection time : 3~5 seconds



1.2 Scratch, dust (W = width, L = length, D = average diameter = (longest + shortest) / 2))

Total defects on each panel.

【 14 inches < Size \leq 22 inches 】 Within 10 pcs / panel
 【 < Size \leq 14 inches 】 Within 7 pcs / panel

Item	Width(mm)	Length(mm)	Acceptable Numbers
Linear (Foreign substance/scratch/ transparent defects) *1 Defects over 0.2mm in diameter will be judged in circular.	$0.15 < W \leq 0.2$	$L \leq 10$	Up to 4pc per product
	$0.1 < W \leq 0.15$	$L \leq 20$	Up to 6pc per product
	$W \leq 0.1$	Acceptable	Acceptable
Circular (Foreign substance/scratch/ transparent defects) *1	$0.5 < D \leq 0.7$		Up to 1pc per product
	$0.3 < D \leq 0.5$		Up to 6pc per product
	$D \leq 0.3$		Acceptable

*1 Transparent defects mean, e.g. bubble , lint etc...

(Lint is the defect that is different transparent from other part due to the elevating surface by printing over foreign substance.)

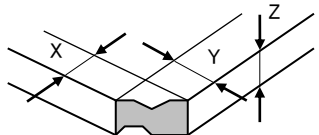
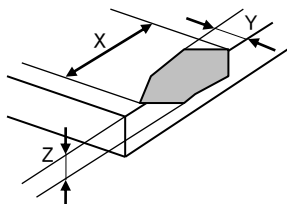
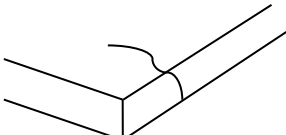
- Stains are acceptable as long as they are not clearly outlined and are not noticeable.
- Applied only in the Viewing Area.

Scratches or dusts in the outside of the Viewing Area are acceptable unless the electrical characteristics are affected.

Product	LCD Modules with Capacitive Glass Sensor Touchscreen	Document No.	22G4GX-00002E-0
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Appearance inspection standard (2)

1.3 Chip(cover glass , touch panel) (t = Glass thickness)

Item	Size(mm)		Acceptable Numbers
Corner		X	$1.0 \leq X \leq 2.0$
		Y	$1.0 \leq Y \leq 2.0$
		Z	$\leq t$
Other than at corners		X	≤ 5.0
		Y	$1.0 \leq Y \leq 2.0$
		Z	$\leq t/2$
Progressive Crack			Not acceptable

1.4 Appearance criteria for color-printed area of covering glass (judged from surface view)

Item	Defect contents	Acceptable range	
Color Peeling	Color print coming off	Unacceptable	
Color Lacking	Color print partly missing	Unacceptable	
Color Running	Ink bleed	The defect should not be over edge face	
Scratch	Scratch on color-printed part	Base glass should not be exposed	
Color Unevenness	Color thickness is uneven	Should be no color unevenness that can be easily detected. (should not be detectable by gaze for 4 - 6 seconds)	
Pinhole through to the base glass, Adhering foreign substance which is different color from the printing	a : $0.2 \text{ mm} < D \leq 0.3 \text{ mm}$ b : $D \leq 0.2 \text{ mm}$	Acceptable quantity	Total acceptable quantity
		a : 2pcs in $\phi 30 \text{ mm}$ b : Acceptable	Up to 5pc per product
Tilt/Misalignment	—	Should be within tolerances indicated by the drawing	

Product	LCD Modules with Capacitive Glass Sensor Touchscreen	Document No.	22G4GX-00002E-0
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