Customer: DATA MODUL AG

Product Specifications

Revision	1
Date	07/30/2019
Product Type	Analog Resistive Touchscreen
DMC Model No.	TP-3324S1F0

Prepared by	Reviewed by	Approved by
DMC TI 2019/07/30 KANEKO	DMC 2019/08/05 川守田	DMC 2019/08/05 星

Customer Approval	
Date	
The above signature represents that the product specifications, testing regulation, and warranty in the specifications are accepted.	

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1. Product Specifications

1-1. Product Applicable

§ This specification is applied to the analog resistive touchscreen specified on the front page.

1-2. Structure

§ Dimensions, structure, and shape are referred on the drawing attached.

1-3. Environmental Specifications

Specification	Value
Operating Temperature	-20°C to 70°C (no condensation)
Operating Humidity	-20°C to 60°C Less than 90%RH (no condensation) Exceeding 60°C 133.8g/m^3 (no condensation)
Storage Temperature	-40°C to 80°C (no condensation)
Storage Humidity	-40°C to 60°C Less than 95%RH (no condensation) Exceeding 60°C 142.9g/m^3 (no condensation)
Chemical Resistance (top surface)	Toluene, Trichloroethylene, Acetone, Alcohol, Gasoline, Machine Oil, Ammonia, Glass Cleaner, Mayonnaise, Ketchup, Wine, Salad Oil, Vinegar, Lipstick, etc.

1-4. Mechanical Characteristics

Specification	Value	
Activation Force	0.05N to 0.8N	
Operating Life	Input (finger)	10,000,000 hits
	Character Input (pen)	100,000 characters
Light Transmittance	Typ. 80%	
Top Surface Hardness	Over 3H (by JIS pencil hardness)	

1-5. Electrical Characteristics

Specification	Value	
Maximum Voltage	DC6V	
Maximum Current	Top Electrode	100mA
	Bottom Electrode	100mA
	Between the Top and Bottom	0.5mA
Linearity	Under ±2% (Four point calibration)	
Terminal Resistance	Top Electrode	412Ω to 962Ω
	Bottom Electrode	239Ω to 557Ω
Insulation Resistance	Neighboring Terminals	Over 20MΩ at 25V
	Active Area Electrodes	Over 20MΩ at 25V
Chattering	Less than 10msec at ON/OFF.	

1-6. Appearance

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

Item	Width (mm)	Length (mm)	Acceptable Numbers	Total
Linear(Scratch/Dust) Over 0.1mm in diameter refer to the Circular.	0.05 < W≦0.1	L≦4	1pcs in ϕ30mm	Within 5pcs per product.
	0.03 < W≦0.05	L≦10	2pcs in ϕ20mm	
	W≦0.03	L≦20	Acceptable	
Circular (Scratch ,Dust)	0.3 < D≦0.4 *1		1pcs in Viewing Area *1	
	0.2 < D≦0.3		2pcs in ϕ30mm	
	D≦0.2		Acceptable	

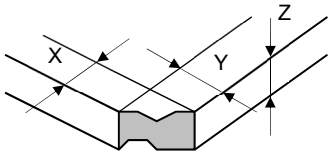
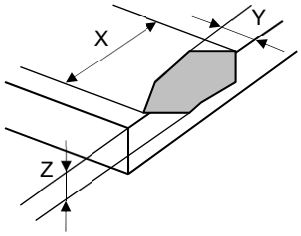
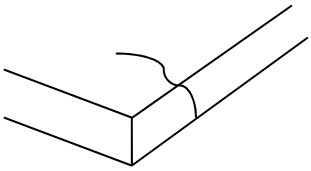
Applied only in the Active Area. Scratches or dusts in the outside of the Active Area are acceptable unless the electrical characteristics are affected.

*1 Applied to the size of 14 inches or more.

§ Dirt

Acceptable if not noticeable on a black mat.

§ Chip, crack (t = glass thickness) (applicable only for the glass)

Item	Size (mm)			Acceptable Numbers
Corner		X	≦3	2pcs /panel
		Y	≦3	
		Z	≦t	
Side		X	≦5	2pcs /side
		Y	≦3	
		Z	≦t	
Crack				Not acceptable

2. Testing Regulation

2-1. Testing Regulation

§ If the regulation is not specified, the test is performed under the supplier's regulation.

§ Tests are performed under the room temperature unless specified. The room temperature is referred as follows:

Temperature: 20±5°C
Humidity: 65±10%RH

2-2. Environmental Specifications

§ Chemical Resistance Test

Condition: Tested after leaving the chemical on the surface for 12 hours being wiped off by cloth.

Judgement: Must be no effect in appearance.

2-3. Mechanical Characteristics

§ Activation Force Test

Condition: Measured by depressing the point between the dots to the conduction by the testing rod (Figure 1).

Judgement: Must satisfy the specification.

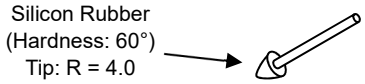


Figure 1. Testing rod 1

§ Operating Life Test (Finger)

Condition: Testing rod: Refer to Figure 1
Voltage: DC5V
Load: 3N
Cycle: 2 hits/sec

Judgement: Must satisfy the following:

Activation Force:	Must satisfy the specification.
Linearity:	Must satisfy the specification.
Terminal Resistance:	Must satisfy the specification.
Insulation Resistance:	Must satisfy the specification.

§ Operating Life Test (Pen)

Condition: Testing rod: Refer to Figure 2
Voltage: DC5V
Load: 2.5N
Input size: 10 x 10 mm
Input character: A to Z/minute

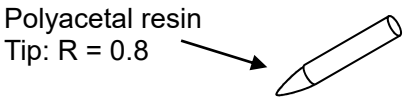


Figure 2. Testing rod 2

Judgement: Must satisfy the following:

Activation Force:	Must satisfy the specification.
Linearity:	Must satisfy the specification.
Terminal Resistance:	Must satisfy the specification.
Insulation Resistance:	Must satisfy the specification.

2-4. Electrical Characteristics

§ Terminal Resistance Test

Condition: Top and bottom electrodes are measured at the terminal.

Judgement: Must satisfy the specification.

§ Insulation Resistance Test

Neighboring Terminals: Measured by applying the reference voltage to the terminals
Active Area Electrodes: Measured by applying the reference voltage to the top and bottom electrodes.

Judgement: Must satisfy the specification.

2-5. Appearance

§ Appearance Test

Condition: Tested by an examiner with over 1.0 eyesight at 30cm away from the product under the transmittable light at over 60° the surface of the product.

Judgement: Must satisfy the specification.

2-6. Delivery inspection

§ Terminal Resistance, Insulation Resistance, Linearity, Appearance are All quantity inspection.

3. Reliability Condition

3-1. Temperature Condition

§ Temperature Condition Test

Following test are performed in the condition with no dew condensation:

Cold Test: Tested after leaving the parts in -40±3°C for 240 hours and in the room temperature for 2 hours.

Heat Test: Tested after leaving the parts in 80±3°C for 240 hours and in the room temperature for 2 hours.

Humidity Test: Tested after leaving the parts in the temperature 60±3°C, humidity 90 to 95% for 240 hours and in the room temperature for 2 hours.

Cycle Test: Tested after 5 cycles of leaving the parts in the temperature -30±3°C for 1 hour and in the room temperature for 0.5 hours, then leaving the parts in the temperature 70±3°C for 1 hour and in the room temperature for 0.5 hours.

Judgement: Must satisfy the following:

Activation Force:	Must satisfy the specification.
Linearity:	Must satisfy the specification.
Terminal Resistance:	Must satisfy the specification.
Insulation Resistance:	Must satisfy the specification.
Appearance:	Must satisfy the specification.

4. Handling Notes

4-1. Precautions

§ This product is intended for use in standard applications (computers, office automation, and other office equipment, industrial, communications, and measurement equipment, personal and household devices, etc.) Please avoid using this product for special applications where failure or abnormal operation may directly affect human lives, or cause physical injury or property damage, or where extremely high levels of reliability are required (such as aerospace systems, vehicle operating control, atomic energy controls, medical devices for life support, etc.).

4-2. Handling Notes

§ Do not depress or scratch the product with any object with a sharp edge or hard end.

§ Do not put this product close to fire.

§ Do not wipe this product with too much load.

§ Do not strongly rub this product locally. It may affect the product's functions.

§ Do not hit the product with a hard object.

§ Do not forcibly bend or fold the product.

§ When the product is stored, make sure it is packed in a packing box and stored in a storage temperature range, eliminating any outside load.

§ Do not use or store the product under a condition where the product will be exposed to water, organic solution or acid.

§ Do not use the product under the direct sunlight.

§ Do not disassemble the product.

§ When you handle the product, Hold the product by its body. Do not hold by the tail.

§ Clean the product with a soft cloth or a soft cloth with neutral detergent or alcohol. When contaminated by chemicals, wipe them off immediately with caution not to cause injury to human body.

§ The edge of the glass is not rounded and may cause injury.

4-3. Construction Notes

§ The environmental specifications, mechanical characteristics, and electrical characteristics are only applied to the Active Area.

§ Do not use the touchscreen when the condensation occurs. The condensation inside of the touchscreen is a natural phenomenon and should disappear after the touchscreen is warmed up.

4-4. Electrical & Software Notice

The best performance can be obtained when used with the original analog resistive touchscreen controller, "TSC-30" Series. If the touchscreen controller or controller software is to be developed by the customer, please note the following:

§ There is a contact resistance between the top and bottom electrodes and it changes by the pressure of a finger or a pen. The data must be read after the contact resistance becomes stabilized.

§ The terminal resistance of the analog resistive touchscreen varies by the individual, time, and environment. The controller software must have the calibration function to adjust the input position and the display position.

§ The analog resistive touchscreen outputs 2 point input as 1 point in between the 2 points. The controller software must not be designed to have the 2 point input function.

§ For drawing applications, the line may be intermittent when the pen comes on the dot spacers. A software compensation is needed.

4-5. Mounting Notes

At mounting the touchscreen, refer to the separate document, [DER-M0009 Resistive Touch Screen Mounting Guidance]. The appropriate structure differs according to touch screen size, LCD, chassis design, usage environment and so on. Please conduct the evaluation with actual products at the trial stage, and confirm that your structure is appropriate prior to fixing the structure design.

5. Warranty

5-1. Warranty Period

§ The warranty period is limited to 1 year from the date of shipping. The warranty for the initial defection such as appearance defection is limited to 1 month.

§ Any defected parts under proper use will be examined by the supplier and replaced by the new parts if the defection is considered to be caused by the supplier.

§ The replacement is subject to be included in the next lot.

5-2. Warranty Target

§ The warranty only covers the product itself and does not cover any damage to others caused by using this product. Onsite repair or replacement is not supported.

§ We will do our best for delivery problem and product defections, but the warranty for the production line is not covered.

§ Resistive touchscreens are structurally not repairable. All defections are subject to replacement.

5-3. Warranty Exceptions

Following conditions are not covered with the warranty and subject to charge.

§ Any malfunctions and damages during transportation and transfer by the user.

§ Any malfunctions and damages caused by a natural disaster or a fire.

§ Any malfunctions and damages caused by static electricity

§ Any malfunctions and damages caused by the failure of the associated equipment.

§ If the product is remodeled, disassembled or repaired by the user.

§ If the product is glued onto the equipment and uninstalled.

§ Any malfunctions and damages caused by an improper usage and handling against the specifications and notes.

5-4. Tools

§ To maintain the quality, the printing screens and the die-cut plates are generally limited to use up to 1 year. Reorders after 1 year from the initial order or from the last renewal are subject to the tooling charge for replacing the printing screens and the die-cut plates. Reorders for the discontinued standard parts are also subject to tooling charge.

§ All the tools, such as CAD data, block copies (films), printing screens, and die-cut plates are not to be provided for administrative purpose.

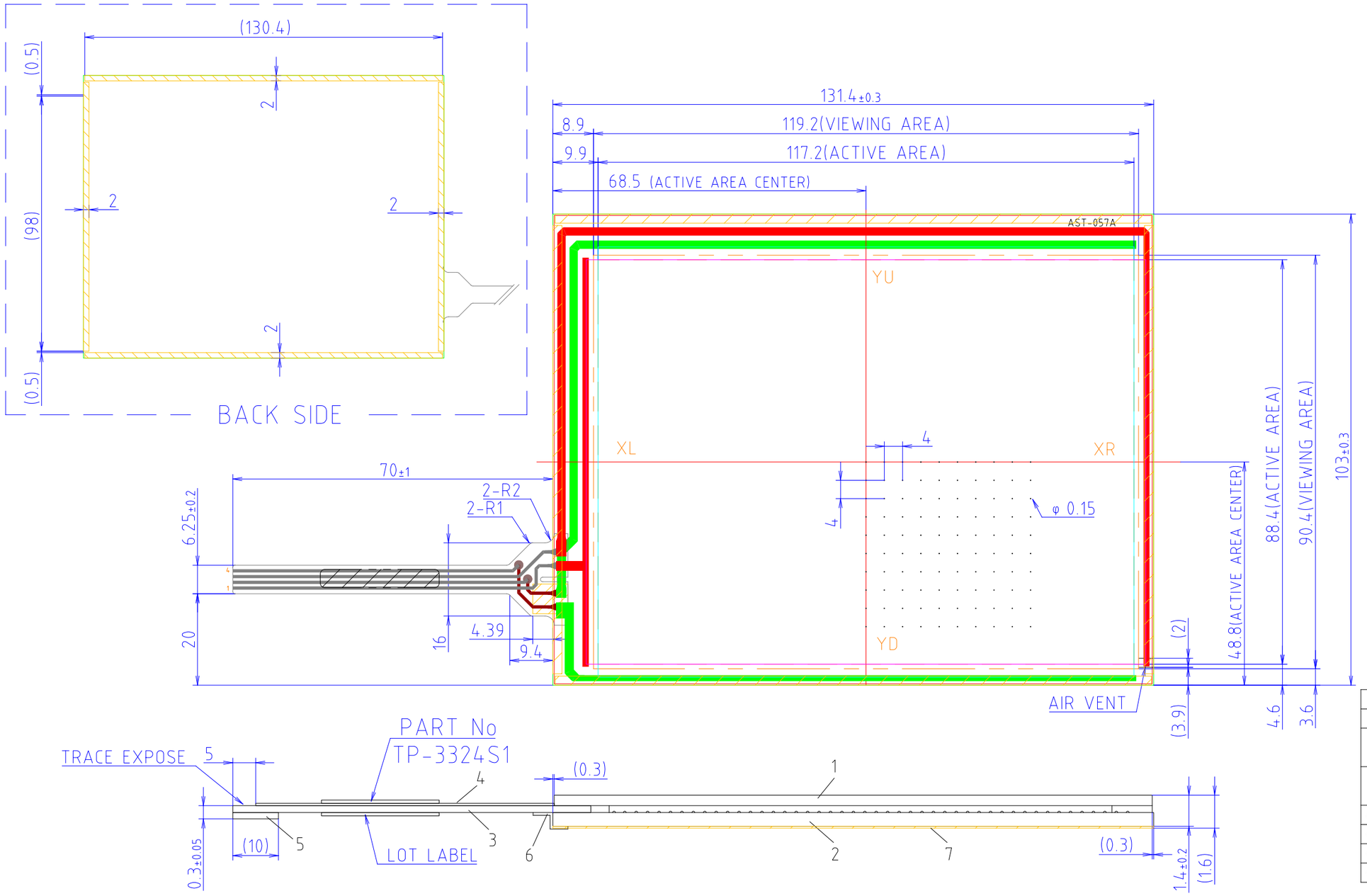
5-5. Changes

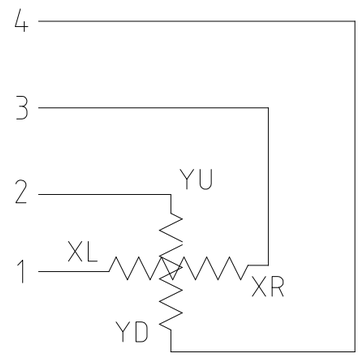
§ Because of the manufacturing process, changing the dimensions, circuit pattern, and the tail position requires replacing most of the tools and is subject to high tooling charge. Please be careful when ordering and approving the drawing.

§ Circuit pattern and the materials that does not affect the environmental, electrical, and mechanical characteristics such as film, glass, ink and glue are subject to change for the supplier’s reason or for improvement within the specifications.

Change History

Rev.	Date	Change No.	Description	Reason	Prepared by
1	07/30/2019		First Issue		Kaneko





PIN ASSIGNMENT

REMARKS		
TAIL PATTERN PITCH		1.25mm
TAIL PATTERN WIDTH	Ag	0.8mm
	-	— mm
CIRCUIT PATTERN WIDTH	Ag	1.5～2.0mm
	-	— mm
○RED: TOP CIRCUIT, GREEN: BOTTOM CIRCUIT.		
○PURPLE: TOP CIRCUIT, LIGHT BLUE: BOTTOM CIRCUIT.		
○0.15φ DOT SPACER ON BOTTOM SHEET.		
○TOLERANCE=0.5mm EXCEPT WHERE INDICATED.		

	ITEM	MATERIAL	REMARKS
1	ITO FILM	POLYESTER 188μm	ANTI-GLARE
2	ITO GLASS	t =1.1mm	
3	TAIL	POLYESTER 38μm	
4	REINFORCEMENT FILM	POLYESTER 25μm	
5	STIFFENER	POLYESTER 250μm	Operating color: Milk white or blue
6	PROTECTION TAPE	POLYESTER 25μm	
7	ADHESIVE SHEET	ACRYLIC 170μm	

Unit: mm

CUSTOMER APPROVAL
DATE: / /

FX-03-19-KN

Rev. No.	DATE	REVISION	NAME
3	Jul/24/19	Mistake correction adhesive tickness 160->170μm	Kaneko
2	Mar/23/09	Operating color of a stiffener is added.	HIRATA
1	Dec/13/04	FIRST EDITION	MOUE

PART No. TP-3324S1F0

TYPE Data Modul Ag

CIRCUIT DRAWING

APPROVED	CHECKED	CHECKED	TRACED	DESIGNED
Jul/30/19		Jul/30/19	Jul/24/19	MOUE
Komang		Komang	Kaneko	

DMC Co., Ltd.

DMC Co., Ltd.
Interface with Touch
http://www.dmccoltd.com/english/
DMC Co., Ltd.
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Resistive Touch Screen Mounting Guidance

Sept 8, 2015
Sales Promotion Dept
DocNo.DER-M0010F

***Refer to the suggested structure and mounting precautions in this document at mounting the touch screens. Appropriate structure differs according to touch screen size, LCD, chassis design, usage environment and so on. Please conduct the evaluation with actual products at the trial stage, and confirm that your structure is appropriate prior to fixing the structure design.**

① Suggested Touch Screen Mounting Structure for Film/Glass Type

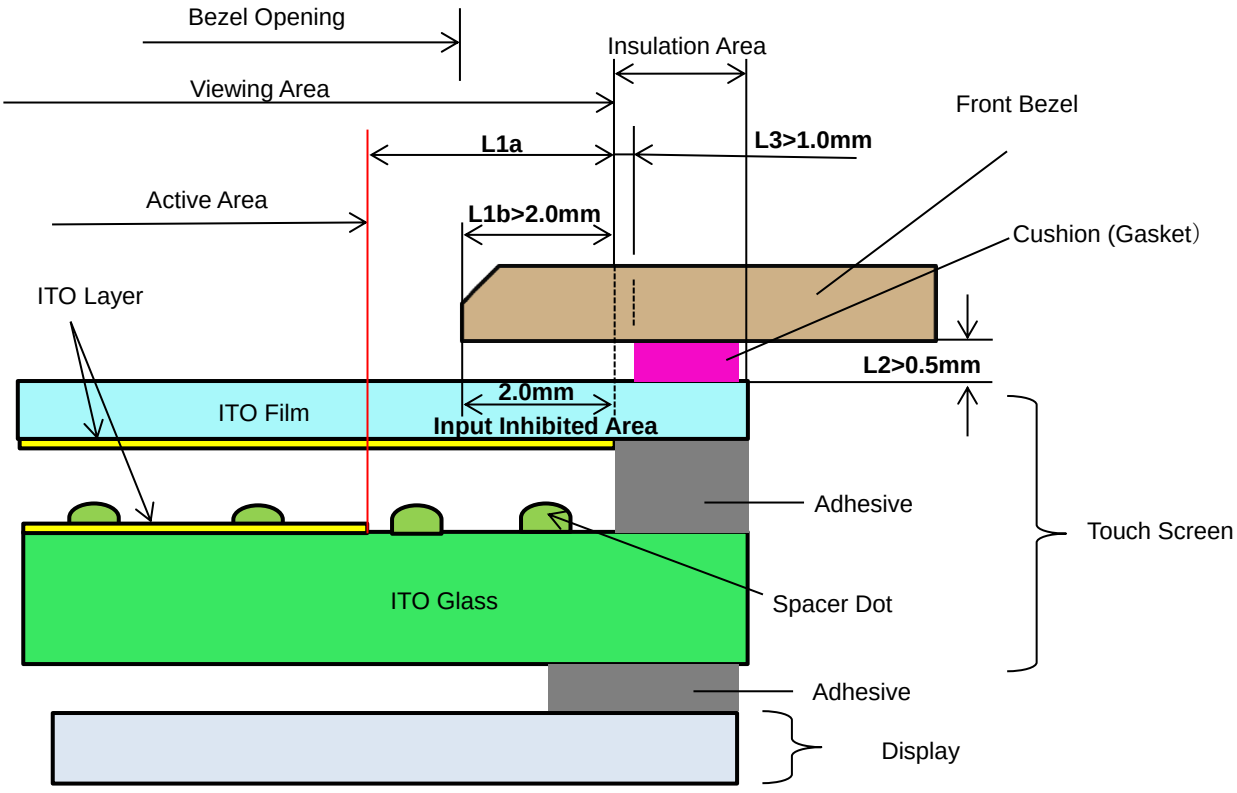

Fig.1

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Interface with Touch
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② Mounting Precautions

a. Bezel Edge (Fig.1&2)

Bezel edge is suggested to be positioned in the area between active area and viewing area (L1a). If the bezel edge overlaps the active area, it may cause a false input when the bezel is pressed.

Input Inhibited Aera (refer to the section d.) is structurally weak against pressure. If the distance between active area and viewing area (L1a) is 2.0mm or longer, the bezel edge (l1b) is recommended to be longer than 2.0mm so that the Input Inhibited Area will be protected by the bezel.

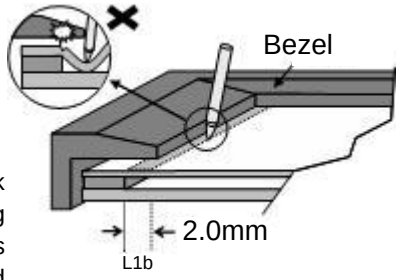

Fig.2

b. Gap between Bezel and Touch Screen (Fig.1&3)

A gap between bottom of the bezel and the touch screen surface (L2) needs to be longer than 0.5mm. Otherwise, the bezel edge may cause false input when the bezel is pressed.

c. Area between Active Area and Viewing Area (Fig.1&3)

If the area between the active area and viewing area (L1a) is pressed, false input may be caused. Do not touch this area. (Fig.3)

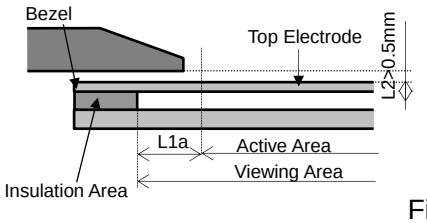

Fig.3

d. Input Inhibited Area (Fig.1&4)

2.0mm from the edge of the insulation area toward the viewing area (Input Inhibited Area) is structurally weak against pressure., epsecially by a pen. If this area is touched by a pen, the film may get stretcehd and the touch scree gets broken, Do not touch on this area directly.

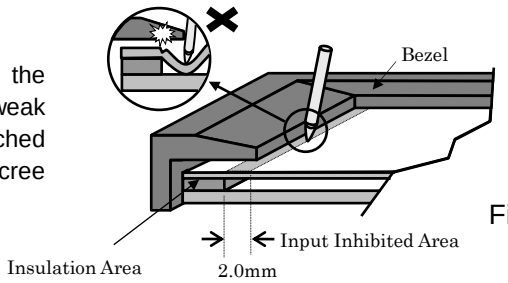

Fig.4

e. Cushion (Gasket) (Fig1&5)

If a cushion is used between the bezel and the touch screen surface, the cushion must be free enough to absorb the expansion and contraction difference between the bezel and the touch screen surface. If the cushion is squashed too hard, the expansion and contraction difference may cause the distortion to the touch screen surface.
The cushion must be positioned more than 1.0mm (L3) outward from an inside of the insulation area. (Refer to Fig.5 & the drawing)

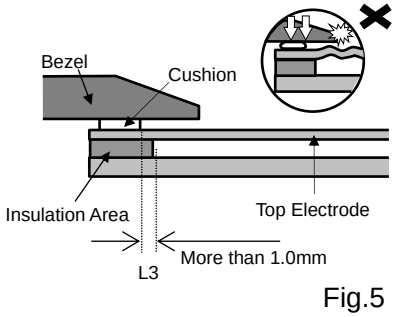

Fig.5

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f. Tolerance (Fig.6)

There is a tolerance of 0.2 to 0.3mm for the dimensions of the touch screen and the FPC connector cable. A gap must be made to absorb the tolerance in the case and the connector.

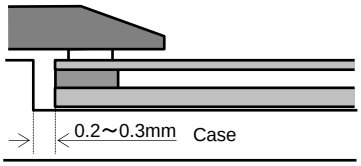

Fig.6

g. FPC Connector Cable (Fig.7)

The FPC connector cable must not be forcibly stressed or bent too hard to avoid the conduction in the insulated area and wire breaking.

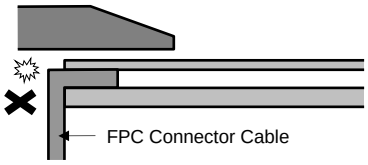

Fig.7

h. Mounting Touch Screen (Fig.8)

Touch screen must be held from the bottom, such as the structure gluing the touch screen onto the display. If the touch screen is glued to the bezel, the adhesion between the top and bottom electrode is stressed and may come off.

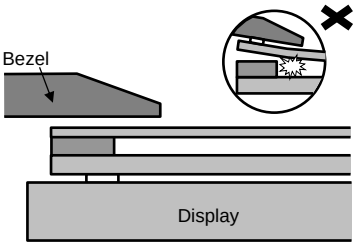

Fig.8

i. Air Vent (Fig.9)

Some touch screens have the air vent to equalize the inside air pressure to the outside one. The air vent must not be covered, and liquid contact must be avoided as the liquid may be absorbed if the liquid is accumulated near the air vent. The top electrode film must not be swelled by the air pressure from inside of the case.

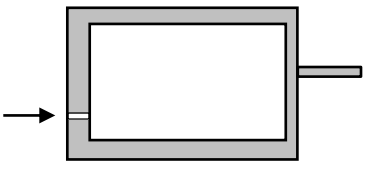

Fig.9