

DMC Co., Ltd.

**Projected Capacitive Touch Screen with Chip on Flexible Controller
DUS-V Series Product Specifications**

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1. Product Specifications

1.1. Product Applicable

This specification is applied to the touchscreen: DUS-V Series.

Product number of DUS-V series are as follows:

DUS-V101W*F200-001 DUS-V101W*F200-002
 DUS-V070W*F100-001 DUS-V070W*F100-002
 DUS-V043W*F100-001 DUS-V043W*F100-002 * = Revision (Alphabet)

1.2. Outline dimensions / Structure

Film / Film Touch screen with Cover glass (COF)

Refer to the Outline dimension drawing in separate.

1.3. Environmental Specification

Item	Specification
Operating Temperature	-20°C to 70°C (no condensation)
Operating Humidity	20%RH~90%RH (no condensation) Not guaranteed under both high temperature and high humidity.
Storage Temperature	-25°C to 75°C (no condensation)
Storage Humidity	20%RH~90%RH (no condensation) Not guaranteed under both high temperature and high humidity.
Chemical Resistance (Sensor surface) Not applied to the COF	Toluene, Trichloroethylene, Acetone, Methanol, Ethanol IPA, Gasoline, Ammonia, Glass Cleaner Testing conditions : Attach the above chemical on the surface of the touch screen for 12 hours and wipe it with a cloth. Judgement criteria : No change in appearance.

* The above specifications are not meant for use in all combination of humidity and temperature.

1.4. Mechanical & Optical Characteristics

Item		Specification	Note
Active Area		DUS-V101W*F200 222.72mm/135.6mm	10.1 in. W
		DUS-V070W*F100 152.4mm/91.44mm	7 in. W
		DUS-V043W*F100 95.04mm/53.86mm	4.3 in. W
Cover Glass		Chemical Strength : CS \geq 450MPa DOL \geq 9 μ m	
Surface Hardness		\geq 6H	pencil hardness testing, complying with JIS K5600-5-4
Light Transmittance		87 \pm 3%	Across all wavelength
Operating Life	Input (finger)	50,000,000hits	See Figure 1
FPC Bending		Bending 10 times when bended at 180 degrees.	See Figure 2

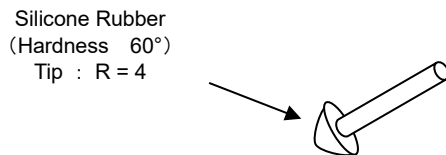


Figure 1: Testing Rod Figure

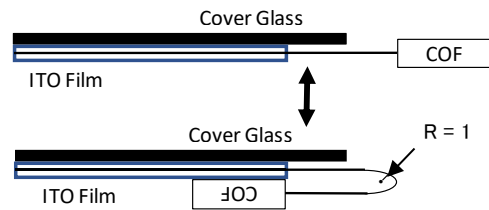


Figure 2: Bending Test

1.5. Controller (COF) Specification

Item		Specification	Note	
Host Interface	DUS-V101W*F200-001(002)	USB Full Speed, (I2C)	Product No. differs in accordance with supported host interface. -001 : USB connector -002 : I2C connector	
	DUS-V070W*F100-001(002)			
	DUS-V043W*F100-001(002)			
Input Power-supply Voltage		4.75~5.25[V]		
Main IC	DUS-V101W*F200-001(002)	MCU 1 [pc] Sensor IC 2 [pc]		
	DUS-V070W*F100-001(002)	MCU 1 [pc] Sensor IC 1 [pc]		
	DUS-V043W*F100-001(002)			
Number of Electrodes	DUS-V101W*F200-001(002)	(X 38 : Y 23)	(Electrode X : Y) Dummy is not included	
	DUS-V070W*F100-001(002)	(X 26 : Y 16)		
	DUS-V043W*F100-001(002)	(X 16 : Y 9)		
Coordinate Performance	Maximum Coordinate Number to Output		2 [Finger]	
	Report rate (1 finger)		100 [Hz]	*1
	Report rate (2 finger)		100 [Hz]	*1
	Report rate (2 finger on same axis)		100 [Hz]	*1
	Electrode resolution		256 [1/Electrode]	
	2-finger minimum distance	DUS-V101W*F200-001(002)	(X, Y) = (20.51, 20.62)	Unit: [mm] 3.5 electrodes
		DUS-V070W*F100-001(002)	(X, Y) = (20.65, 19.95)	
		DUS-V043W*F100-001(002)	(X, Y) = (20.79, 20.93)	
	1 finger : High accuracy area		±2% max.	Active area ratio *2
	2-finger : High accuracy area		±4% max.	Active area ratio *2
	1 finger : low accuracy area		±5% max.	Active area ratio *2
	2-finger : low accuracy area		±8% max.	Active area ratio *2
	Low accuracy area	DUS-V101W*F200-001(002)	(X, Y) = (17.58, 17.67)	Unit: [mm] 3 electrodes from edge.
		DUS-V070W*F100-001(002)	(X, Y) = (17.7, 17.1)	
		DUS-V043W*F100-001(002)	(X, Y) = (17.82, 17.94)	
Low Power Mode		USB Suspend mode		
Calibration	Calibration function		Support	
	Calibration Time		10 – 15 [sec]	

*1 Report rate depends on CR values of the sensor. This specification is applied to the operation at 250kHz clock scan.

*2 Coordinate accuracy is the value with a condition of contact size of $\phi 10$ where influence of noise doesn't exist. The value may vary depending on extrinsic noise.

1.5.2 Host Interface

1.5.2.1 USB Interface

Item	Specification	Note
Host Interface	USB 2.0 Full speed 12[Mbps]	
Power supply	Bus-powered	
Power type	Low power device	$\leq 100\text{mA}$
VendorID/ProductID	0x0AFA / 0x07D3 (Firmware Update : 0x0AFA / 0x07D0)	
Power save mode	USB Suspend mode (Complying with USB specification)	

1.5.2.2 I2C Interface

Item	Specification	Note
Slave address	0x5C	7 bits
Transfer speed	400kHz	Fast mode
Slave mode	Single master IC only. Multi-master IC is not supported.	

1.5.3 Electrical Characteristics

1.5.3.1 Absolute Maximum Ratings

Item	Specification			Unit	Note
	Min.	Typ.	Max.		
USB power Supply	-0.3	—	6	V	

1.5.3.2 DC Characteristics

1.5.3.2.1 Consumption Current (@ Ta= 25°C, Vcc = 5V)

DUS-V101W*F200-001(002)

Parameter	Specification			Unit	Note
	Min.	Typ.	Max.		
Consumption current (in operation)	—	50	—	mA	Vcc=5 V±5%
Suspend mode	—	500	—	μA	Vcc=5 V±5%

DUS-V070W*F100-001(002), DUS-V043W*F100-001(002)

Parameter	Specification			Unit	Note
	Min.	Typ.	Max.		
Consumption current (in operation)	—	40	—	mA	Vcc=5 V±5%
Suspend mode	—	500	—	μA	Vcc=5 V±5%

1.5.3.2.2 Reset Signal

Parameter	Specifications			Unit	Note
	Min.	Typ.	Max.		
Input High Voltage	0.7VDD	—	VDD+0.5	V	
Input Low Voltage	-0.5	—	0.3VDD	V	

1.5.3.2.3 USB Signal (D+, D-)

DUS-V101W*F200-001

Parameter	Specification			Unit	Note
	Min.	Typ.	Max.		
Input High Voltage	2.0	—	VDD+0.2	V	
Input Low Voltage	—	—	0.8	V	
Output High Voltage	2.8	—	3.6	V	
Output Low Voltage	—	—	0.3	V	

DUS-V070W*F100-001 / DUS-V043W*F100-001

Parameter	Specification			Unit	Note
	Min.	Typ.	Max.		
Input High Voltage	2.0	—	VDD+0.2	V	
Input Low Voltage	—	—	0.8	V	
Output High Voltage	2.8	—	3.6	V	
Output Low Voltage	—	—	0.3	V	

1.5.3.2.4 IO Signal (SCL, SDA, GPI01)

DUS-V101W*F200-002

Parameter	Specification			Unit	Note
	Min.	Typ.	Max.		
Input High Voltage	2.0	—	VDD+0.2	V	VDD=5.25V
Input Low Voltage	-0.3	—	0.8	V	VDD=4.75V
Output High Voltage	2.4	—	—	V	VDD=4.75V
Output Low Voltage	—	—	0.45	V	VDD=5.25V

DUS-V070W*F100-002 / DUS-V043W*F100-002

Parameter	Specification			Unit	Note
	Min.	Typ.	Max.		
Input High Voltage	2.0	—	VDD+0.2	V	VDD=5.25V
Input Low Voltage	-0.3	—	0.8	V	VDD=4.75V
Output High Voltage	2.4	—	—	V	VDD=4.75V
Output Low Voltage	—	—	0.45	V	VDD=5.25V

1.5.4 Connector

1.5.4.1 Applicable Connector

Connector Number	COF Model Number	Applicable Connector	Maker
CN1	SM06B-XSRS-ETB	06XSR-36S	JST
CN2	SM10B-XSRS-ETB	10XSR-36S	JST

1.5.4.2 Pin Assignment

Connector Number	Terminal Number	Terminal Name	I/O	Description
CN1	1	V-BUS	P	Power supply (+5V)
	2	GND	P	USB GND
	3	D-	I/O	USB D-
	4	D+	I/O	USB D+
	5	GND	P	GND
	6	RSTn	I	Terminal for external reset signal input. Setting this pin "active Low(L)" makes the chip to the initial state.
CN2	1	ICE_CK	I	Serial Wired Debugger Clock Pin
	2	ICE_DAT	I/O	Serial Wired Debugger Data Pin
	3	RSTn	I	Terminal for external reset signal input. Setting this pin "active Low(L)" makes the chip to the initial state.
	4	SCL	I/O	I2C Clock Pin
	5	SDA	I/O	I2C Data input / output Pin
	6	INT	I/O	Interrupt pin
	7	V-BUS	P	Power supply (+5V)
	8	UART_TX	O	Data transmitter output pin for UART 1
	9	GND	O	GND
	10	UART_RX	I	Data receiver input pin for UART 1

2. Appearance Criteria on touch screen

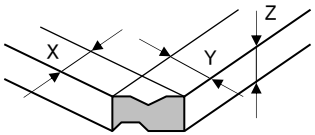
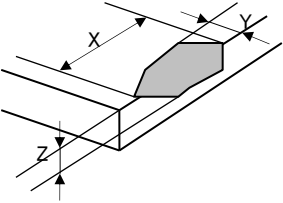
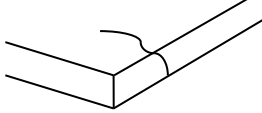
2.1 Flaw & Foreign Particle (For viewing area)

(W : Width L: Length D : Average diameter = (longest + shortest diameters) / 2)

Item	W (mm)	L (mm)	Acceptable Number
Liner defects (*1) Defects over 0.2mm in circular.	$0.15 < W \leq 0.2$	$L \leq 10$	Up to 4pcs per product
	$0.1 < W \leq 0.15$	$L \leq 10$	Up to 6pcs per product (including other defects)
	$W \leq 0.1$	$L \leq 30$	Acceptable
Circular defects (*1)	$0.5 < D \leq 0.7$		Up to 1pc per product
	$0.3 < D \leq 0.5$		Up to 6pcs per product (including other defects)
	$D \leq 0.3$		Acceptable

*1 This criteria is applicable only to the viewing area. Flaws and foreign particles should be accepted outside the viewing area unless such defects have an impact on electric characteristics.

2.2 Chipping and Crack on Cover glass (t = glass thickness)

Item	Size (mm)		Acceptable Number
Chip at Corner 	X	≥ 1.0	≤ 2 pcs / Product However, it is acceptable if X and/or Y is less than 1.0mm is acceptable unless X and/or Y reach the black-printed area.
	Y	≤ 2.0	
	Z	$\leq t$	
Chip other than at corners 	X	≤ 5.0	≤ 8 pcs / Product However, it is acceptable if distance between defects is less than 15mm
	Y	$1.0 \leq Y \leq 2.0$	
	Z	$\leq t/2$	
Crack			Should not exist.

2.3 Appearance criteria for color-printed area of covering glass

(Judged from surface view)

Item	Defect content	Acceptable range	
Color Peeling	Color print coming off	Unacceptable	
Color Lacking	Color print partly missing	Unacceptable	
Ink bleed	Ink bleed existence	The bleed should not touch the edge of cover glass.	
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 gazing for 4-6 seconds)	
(1) Pinhole that can see through to the base glass (2) Attached foreign particles that defer from the color of the printing	D: Average diameter, meaning (longest+ shortest diameters) / 2	Acceptable quantity	Total acceptable quantity
	a : $0.2 < D \leq 0.3$ b : $D \leq 0.2$	a : Up to 2 defects in the area of $\phi 30\text{mm}$ b : Acceptable	Up to 5 defects per product
Tilt/Misalignment		Should be within tolerances indicated by the drawing.	

2.4 Appearance inspection method

2.4.1 Direction

Checking angle will be within the $\pm 30^\circ$ facing the specimen.

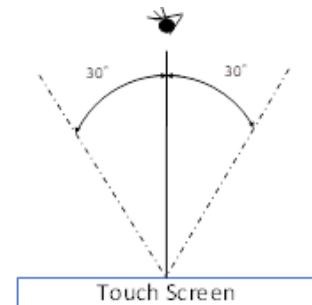
2.4.2 Conditions

Checker will see with the distance of $35 \pm 5\text{cm}$ from the specimen for approx.

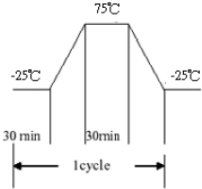
3~5 seconds, with eyesight of equal to or more than 0.7.

2.4.3 Illumination

Illumination: $1,000 \pm 200\text{lx}$



3. Reliability Testing Result

Items	Sample Number	Condition	Criteria	Result (NG/Sample)
Low temperature storage	5	-40°C, 240H	To pass Electric Characteristic and Appearance Criteria	0/5 *2
High temperature storage	5	80°C, 240 H		0/5 *2
High temperature & High humidity storage	5	60°C, 90 %RH, 240H		0/5 *3
Thermal shock storage	5	-25°C, 0.5H ⇔ 75°C, 0.5H 10cycles 		0/5 *2

- *1 “0/5” means that there were no failures in the testings out of 5 pcs. of specimens.
- *2 The measurement after testing is implemented after the samples concerned are stored in room temperature for at least 2hours with no condensation.
- *3 The measurement after testing is implemented after the samples concerned are stored in room temperature for at least 24 hours with no condensation.
- *4 The tests conducted above are sole testing and are not the result from sequential testing.
- *5 The Above table shows only the results of actual testing and is not guaranteed, being considered just as showing the levels of seeming quality.

4. Packing specification & Lot Code.

Instruction of lot number:

LOT NO. :	0	0	0	8	3	5	2	5	(EX)
									Date
									01-1 st
									02-2 nd
									31-31 th
									Week
									1 — 7
									Week of Month
									1 — 5
									Month
									01-January
									02-February
									12-December
									Year
									00-2000
									01-2001

Model : DUS-V10(WAF200-001)
(UOP-101011FA)
LOT NO. 18033314
Qty : 40 PCS
N.W. : ** Kg
G.W. : ** Kg
DMC Co., Ltd.
Consigned producer :

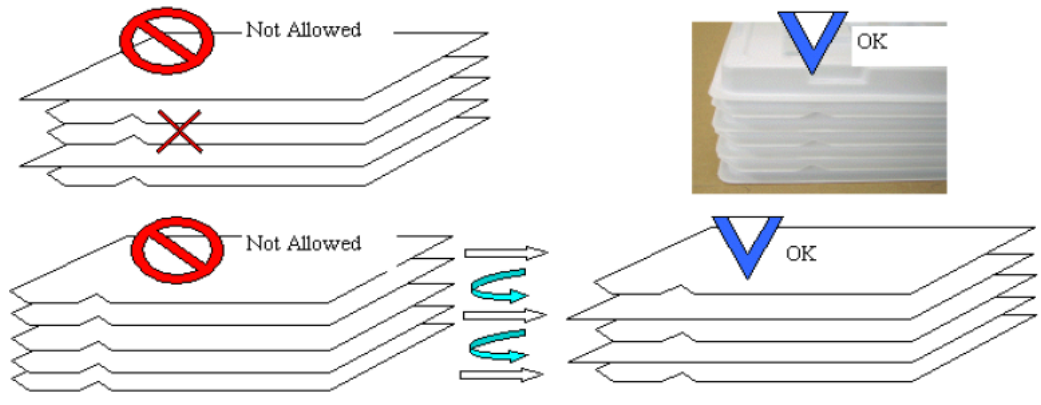
Carton Box

UNITED RADIANT TECHNOLOGY CORP.
光聯科技股份有限公司

FRAGILE 落下嚴禁

C/NO. MADE IN TAIWAN

Packing tray must be stacked with alternated direction to each others.
To tacks packing trays in same direction will cause product damaged.

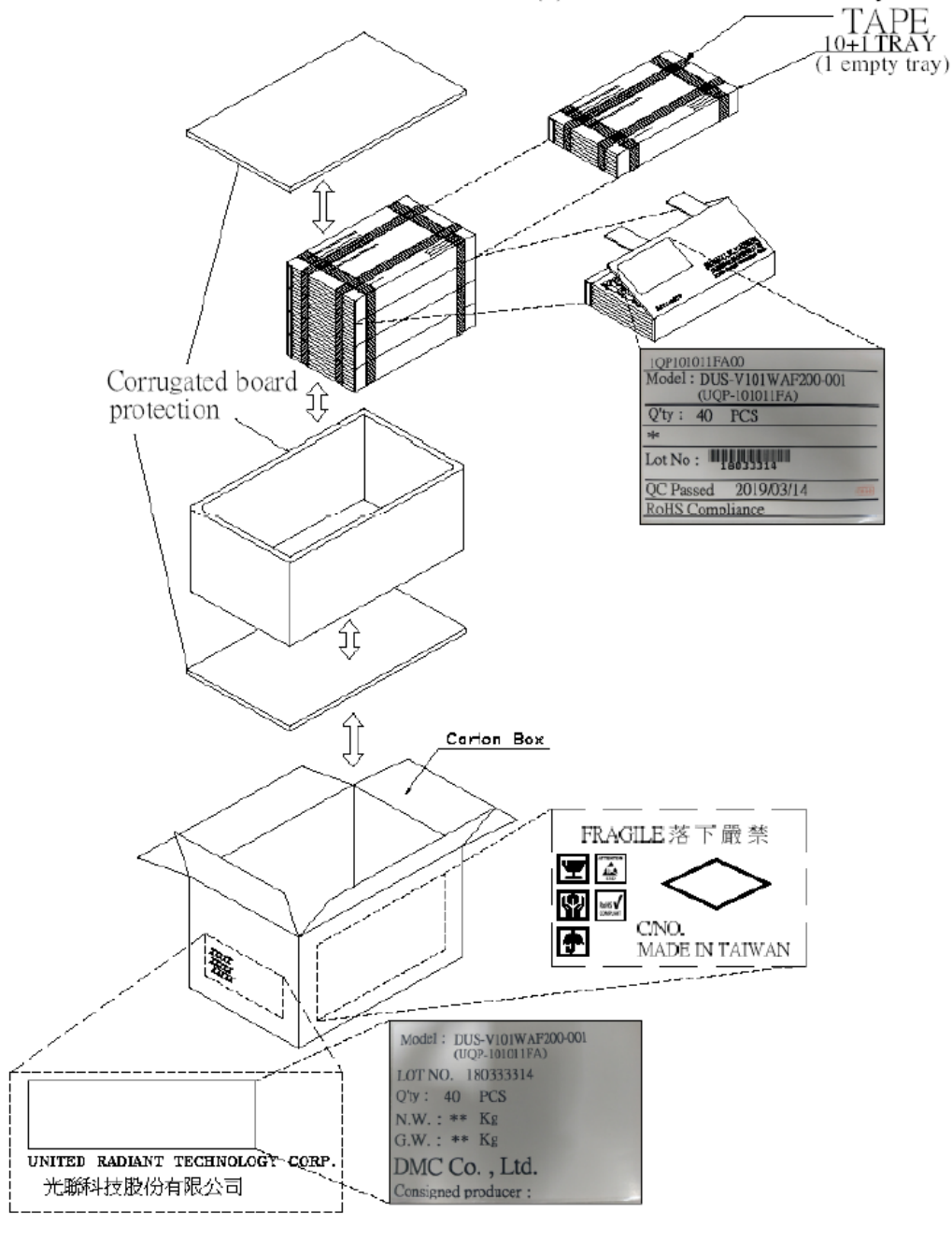


MODEL NO: UQP-101011FA

- 1 pcs / Tray
- 10+1 Tray / Box
- 4 Box / Carton
- 40 pcs / Carton

NOTE:

- (1) Be warned, the direction of the tray has to turn it by 180 degree before stack it up. Otherwise, it will be packager's responsibility!!
- (2) Safe Stack : 5 cartons only



5. Precaution

Operation may become unstable depending on the surrounding environment.

Do not use the controller under environments that may affect capacitive values (Possible affecting factor is power supply noise.).

The application tool, TP-Offset must be executed in advance of the use of touch screens.

TP-Offset, the application software, which can be downloaded from the DMC's website shown in below. It is executable on Windows OS.

DMC's website: TP-Offset download page

<http://www.dmccoltd.com/english/download/tpoffset.asp>

6. Attention in Handling

6.1. Precautions

This product is intended for use in standard applications such as computers, office automation, industrial, communication, measurement, and home appliance equipment, etc. Avoid using this product in application where failure or malfunction of the systems which incorporate the touch screen may lead to the danger of human lives, physical injury, property damage, or in application where extremely high levels of reliability are required such as aerospace, vehicle operating control, and atomic energy control, medical devices for life support, etc.

6.2. Handling Notes

Do not apply force or scratch the product with a sharp-edged tool or pointed 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 the condition where the product can be exposed to water, organic solution or acid.

Do not use the product under direct sunlight.

Do not disassemble, take apart, or alter the product.

Never hold the COF part when you hold the product.

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

Keep the product away from any conductive materials while in use.

Do not touch the conductive part of the product to avoid being damaged by the electrostatic discharge.

6.3. Attention on structure

The Environmental specifications, Mechanical & Optical characteristics are only applicable to the Active Area.

Do not use the product when condensation may occur.

6.4. Attention on Mounting

In mounting the product, refer to the separate document, [GlassFilmFilm structure with COF mounting guidance]. Conduct thorough evaluation with actual products at the trial stage.

7. Warranty

7.1. Warranty Period

The warranty period is limited to one(1) year from the date of shipping. The warranty for the initial deflection such as appearance deflection is limited to one(1) month.

Any supposedly defected parts under proper use will be examined by the supplier and replaced with new parts if the deflection is determined to be caused by the supplier.

The replacement may be subject to be included in the next production lot.

7.2. Warranty Scope

The warranty only covers the product itself and does not cover any secondly damage caused by using the concerned product. Onsite repair or replacement is not supported.

We will sincerely respond to delivery problem and product defections, but the warranty for the production line is not covered.

Projected Capacitive Touch Screen with Chip on Flexible Controller are structurally not repairable.

7.3. 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 force majeure.

Any malfunctions and damages caused by static electricity.

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

In the case the product is remodeled, disassembled or repaired by the user.

In the case the product is uninstalled after glued onto equipment.

Any malfunctions and damages caused by an improper usage and handling against the clauses in this specifications.

7.4. Tools

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

7.5. Changes

Circuit pattern and the materials that do 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.

7.6. RoHS Compliance

This product complies with RoHS.

8. Revision History

Rev. 1.0 (June. 11, 2019)

Newly released

DUS-V Series Product Specifications

Rev. 1.0, June 11, 2019

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DMC Co., Ltd.

<http://www.dmccoltd.com/english/>

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Glass/Film/Film structure with COF Projected Capacitive Touch screen, Mounting Guidance

Projected capacitive touch screen detects the touched locations by measuring the increased amount of the capacitance value between its electrodes. Once it is built into a system, capacitance couplings are continually yielded among the touchscreen, FPC tail, COF and metal Chassis.

If surrounding environment changes or materials to alter the electrical field (a large capacitor, power-supply unit, LCD panel, or materials with high dielectric constant) is near, these external factors will adversely affect the function of the touch screen to detect the correct input positions.

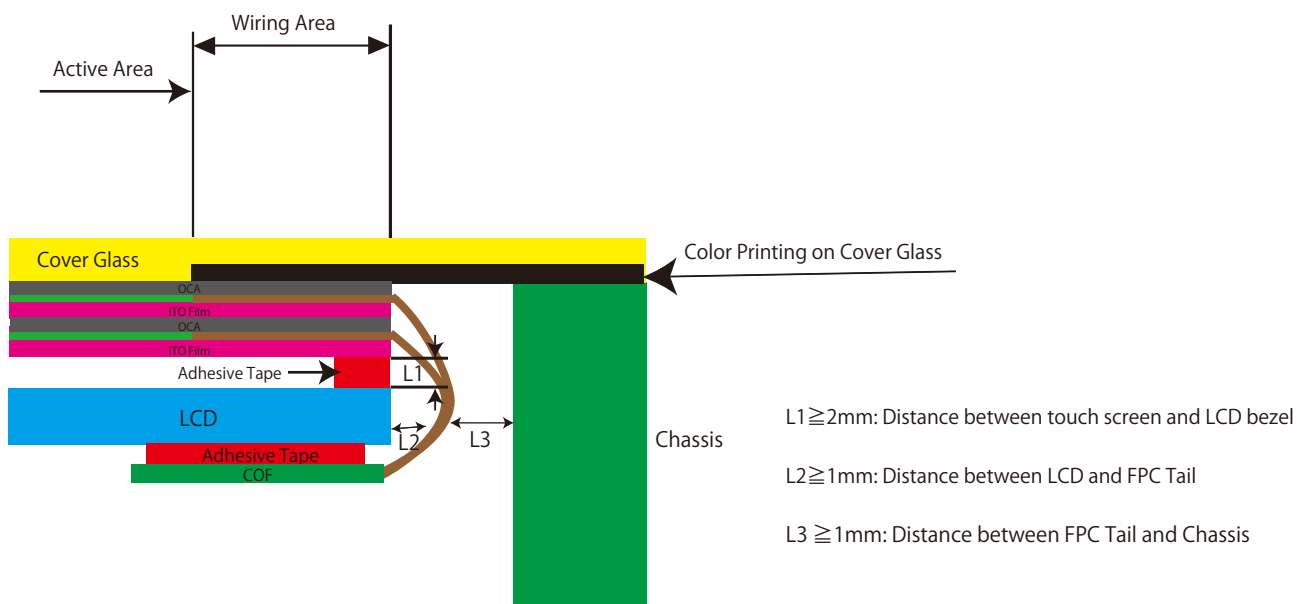
At structure design, please refer to the mounting guidance below and ensure enough gap distances among each component in order to avoid the external factors described above.

Fix the touchscreen firmly so that the gap distances between the touchscreen and other components will not be affected by touching or will not change with the passage of time. An unexpected input may be caused if the gap is too narrow.

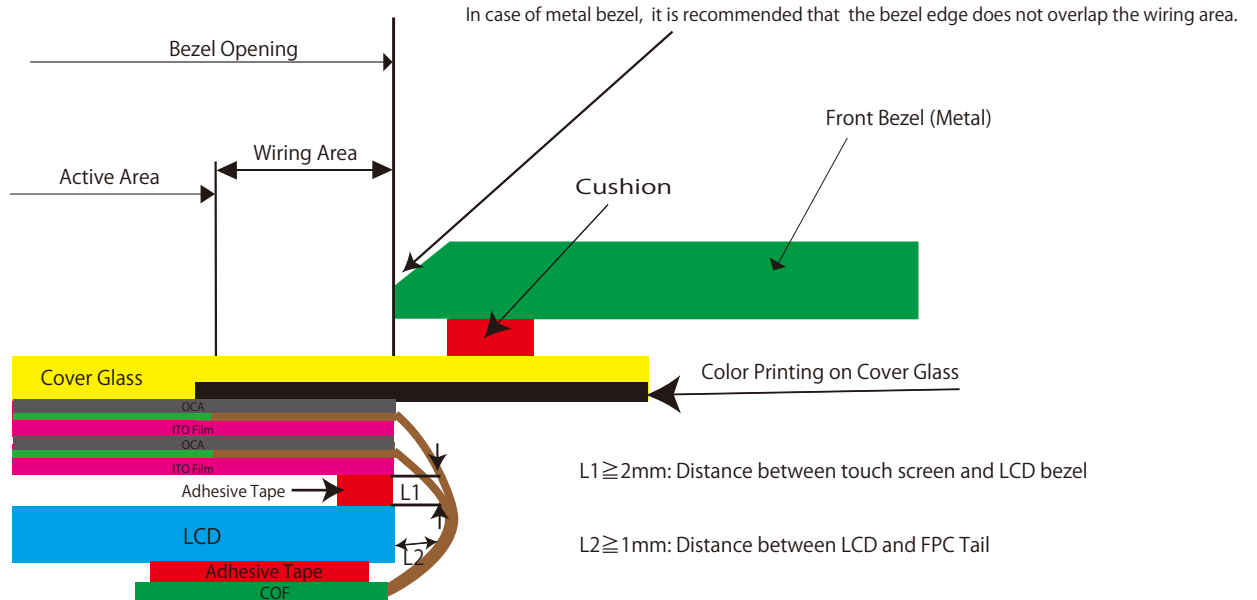
In order to avoid the gap distance L1 from being changed with the passage of time, it is recommended to apply the adhesive tape onto all the 4 sides with no space (fully sealed) when gluing the touch screen.

The distance values indicated in this sheet are for reference only.
The appropriate distance values depend on touch screen size, LCD, chassis design and other factors.
Please confirm the appropriate distances with the actual products prior to fixing the chassis design.

Flat-surface Structure



Structure with Metal Bezel



Structure with Resin Bezel

