

Product Information

GT1001

**Armored Sunlight Readable Resistive Touch Panel
with chemically strengthened AR glass surface
Designed for Industrial and Military Applications**

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1. FEATURES OF GT1001

Touch Type	4 & 5 -Wire Analog Resistive Touch Panel			
	Top Surface	Top ITO Layer	Bottom ITO Layer	Circular Polarizer
Substrate	Soda Lime Micro Glass	Plastic	Glass	
Thickness	0.1 ~ 0.3 mm	100~150μm	0.7, 1.1, 1.8 mm	
Type/Treatment	Chem. Strengthened* AR and Anti Finger Print Treated	Anti-Newton Ring	Chem. Strengthened, Coated, and Cut	
Input Mode	Stylus or Finger			
Connector	FPC			
Reflectance	Specular reflectance is <1.2% at 30°, diffuse reflectance is <0.1% at 30°			
Outdoor Readability	Equivalent to 1000 nits display unit			
*For touch panel smaller than 6.4", top surface will be chem. strengthened, coated, and cut to the size.				

2. GENERAL SPECIFICATIONS

Description Item		Specification unit: mm, unless otherwise noted
(1)	Frame Area	FFF.FF ±0.30 X FFF.FF ±0.30
(2)	View Area	VVV.VV ±0.20 X VVV.VV ±0.20
(3)	Active Area	AAA.AA ±0.20 X AAA.AA ±0.20
(4)	Total Thickness (Tt)	T.TT ± 0.15
(5)	Tail Length	LL.LL ±1.00

Note 1. Actual General Specification is listed in the table of Appendix II. Drawing with additional specifications of product is available per request.

3. ENVIRONMENTAL CHARACTERISTICS

Status	Temperature	Humidity
(1) Operation	-30°C ~ + 70°C	20%~90% RH
(2) Storage	-40°C ~ + 80°C	20%~90% RH

Note1: Parts of GT1001 are fully compliant with the requirements of RoHS (Restriction of Hazardous Substances Directive). Label of RoHS (as shown) will appear on GT1001 package.



4. OPTICAL CHARACTERISTICS

Item	Specification
(1) Transparency	68~72% with compensation of retarder film
(2) Newton Ring	invisible
(3) Reflectance	(Specular Reflectance < 1.2% at 30 degree angle) (Diffuse Reflectance < 0.15%, at 30 degree angle)

Note1: Reflectance measured per MIL-L-85762A, as indicated in Figure 4 at 30° off H-axis.

5. ELECTRICAL CHARACTERISTICS

Specification	
Terminal Resistance	Up: 400 ~ 1000Ω , Down : 150 ~ 800Ω
Linearity	X axis ≤ 1.5%, Y axis ≤ 1.5% (Test method reference Item 9)
Chattering	≤30 ms
Insulation	≥ 20 MΩ/25V(DC)
Endurance	No arcing damage at DC 25V/60sec
Operative Resistance	≤ 2KΩ

Note for Sections 6 and 7: Tests conducted per military requirements used a 10.4" 8-wire touch panel or the same touch panel back-laminated with a 5 mm glass in a water proof fully assembled housing as testing samples. Results are presented solely for your reference and are not to warrant your customized parts meeting the same specifications. It is highly recommended that customers are to conduct their own set of tests and make sure the customized touch panel is meeting the requirements in your specific application.

6. MECHANICAL CHARACTERISTICS

Item		Condition	Specification
(1)	Operation Force	Stylus = R0.8 mm	Normally ≤ 1.5 lbs (static pressure)*
(2)	Boot Impact	Perpendicular force of 285 lbs \pm 15 lbs; a rectangular contact striking surface (rubber, leather, or equivalent) measuring 1.0 \pm 0.2 by 0.5 \pm 0.1 inches	1 time, no damage (Impact at center area)
(3)	Ball-Drop Test	2 OZ Steel Ball Dropping from 30"; 3 times	
(4)	Hardness	Toughened glass surface with 24,000lb modulus of rupture	$\geq 7H$
Touch panel demonstrates no performance or physical degradation during and after mechanical shock (method 516.5, figure 516.5-1), bench handling (method 516.5, procedure VI), and vibration (method 514.5) in accordance with MIL-STD-810F.			
*Operation force may be higher within 5 mm from the edge of activation area.			

7. RELIABILITY

Tests on the bare touch panel	
Constant Temperature/Humidity	80°C/90%RH, 48 hrs and normalized for 4 hrs;
Heat Cycle	70°C/120hrs and normalized for 4 hrs
Cold Cycle	-20°C/120hrs and normalized for 4 hrs and 4 hours at -46°C
Thermal Cycle	-20°C~+70°C(0.5hr each), 10 Cycles (within 24 hr) and normalized for 4 hrs
Tests on the water proof unit with touch panel back-laminated to a 5 mm glass	
Operating Temperature	High temperature: MIL-STD-810F, Method 501.4, constant temperature +60°C for 6 hours Low temperature: MIL-STD-810F, Method 502.4, Procedure II for 4 hours at -46°C
Non-Operating Temperature	(1) Meets MIL-STD-810F, Method 501.4, High Temperature, Procedure I, Storage for 48 hours at +71°C (2) Meets the requirements of MIL-STD-810F, Method 502.4, Low Temperature, Procedure I, and Storage for 30 hours at -51°C
Thermal Cycle	No performance or physical degradation during and after temperature changes from -32°C to +21°C in 10 minutes and
Humidity and Latitude	(1) No performance or physical degradation during and after exposure to the induced hot-humid conditions of MIL-STD-810F, Method 507.4, for 15 cycles (2) No performance or physical degradation at an equivalent altitude of up to 10,000 feet when tested IAW MIL-STD-810F, Method 500.4, Procedure II

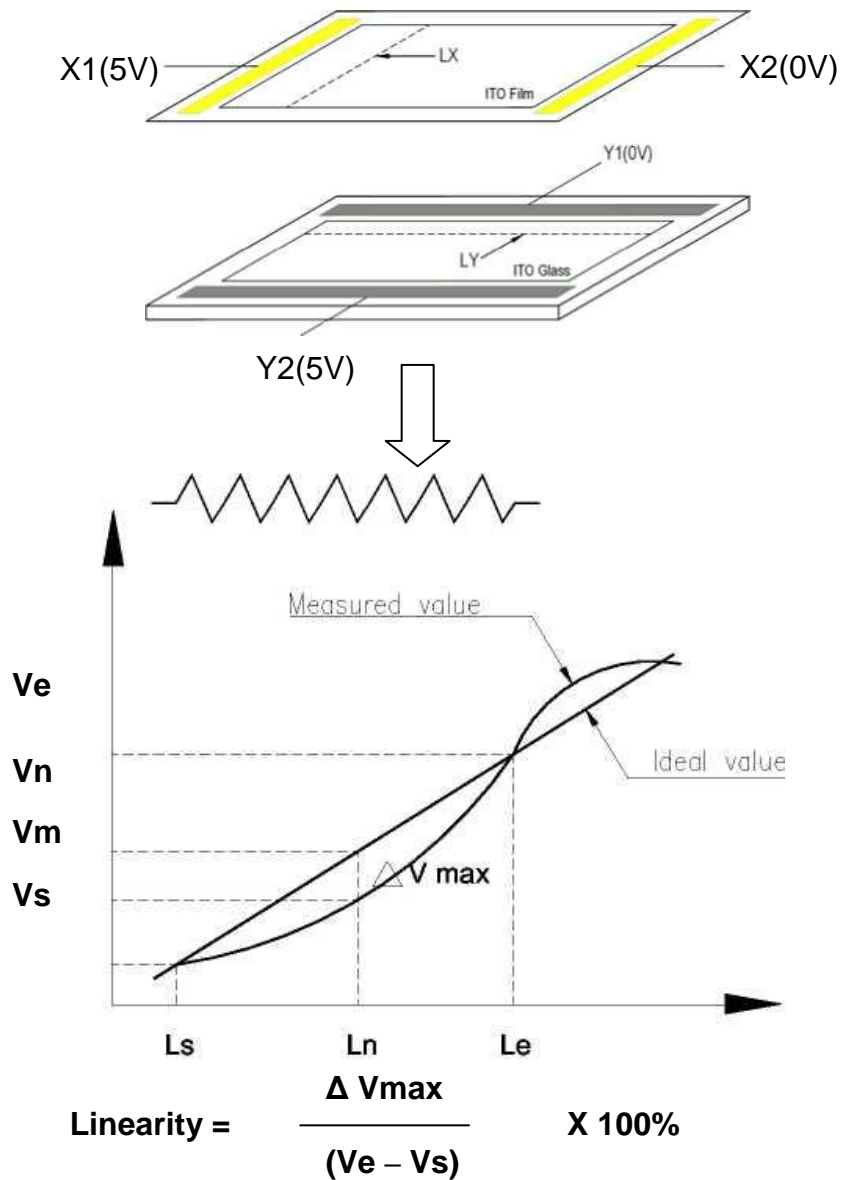
8. DURABILITY

	Item	Condition	Specification
(1)	Write Test	100,000 times, Force 250g ,R0.8	
(2)	Knock Test	1,000,000 times , Force 250g , 3HZ, R8/HS60	Same as above

9. INSPECTION METHOD

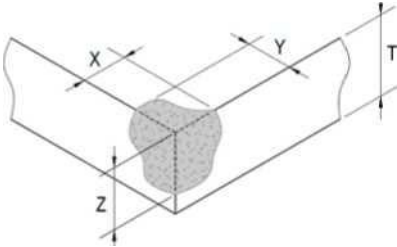
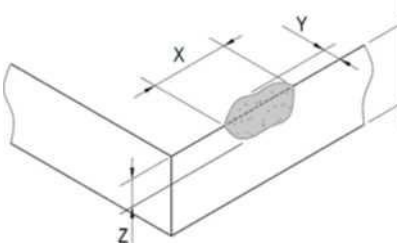
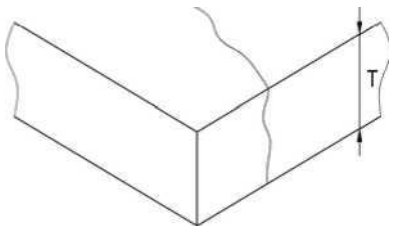
Linearity Condition:

Voltage (DC 5V) is applied to X1 or Y2 and ground (0V) is applied to X2 or Y1. Using stylus to draw straight lines (LX and LY) at 5mm intervals within active area and detect the voltage at Y2 or X1. To Measure the voltage differences between X1 and X2 or Y1 and Y2.



10. APPEARANCE INSPECTION

- (1) Cosmetic imperfections are allowed outside viewing area except for those affecting electrical functions.
- (2) Inspection shall be performed by using one 17w fluorescent lamp located approximately 40 cm above the inspection item. The inspector shall be approximately 30cm away from the inspection item.
- (3) Glass flaw: The following table indicates permissible limits to glass imperfections.

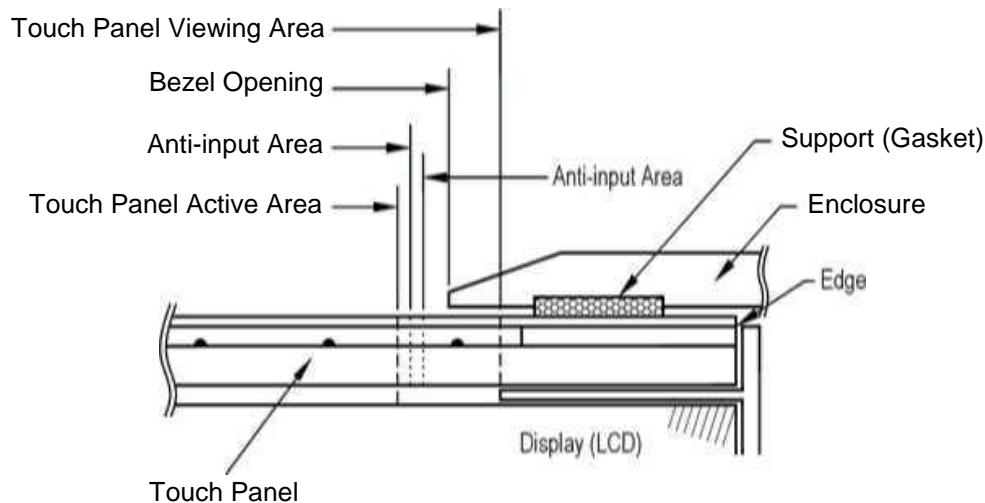
Corner Flaw		$X \leq 3.0\text{mm}$ $Y \leq 3.0\text{mm}$ $Z \leq T$
Edge flaw		$X \leq 3.0\text{mm}$ $Y \leq 3.0\text{mm}$ $Z \leq T$
Progressive flaw		None allowed

T = Glass Thickness

Please Refer to Appendix I for Appearance Specifications.

11. MOUNTING AN OPERATING CONDITION

- (1) Front surface sealing materials must lie outside of the touch-screen active area to avoid accidental activation of this device.
- (2) Design enclosure with sufficient clearance to avoid pressing on touch panel surface.
- (3) Bezel must not touch Active Area.
- (4) Pressing or drawing on area between viewing area and active area should be avoid.
- (5) Pressing or drawing on anti-input area is “**ABSOLUTELY FORBBIDEN**”.
- (6) The edges of the touch-panel are conductive and should never come into contact with conductive mounting or enclosure materials.



12. GUARANTEE

With the exceptions listed below, ALP products are guaranteed free of manufacturing defects for a period of up to one year. All defective products will be repaired or exchanged free of charge if such defects are determined to be the responsibility of ALP. ALP reserves the right of sole discretion in determining the causes and the responsibilities of any defects or damages.

List of Exceptions:

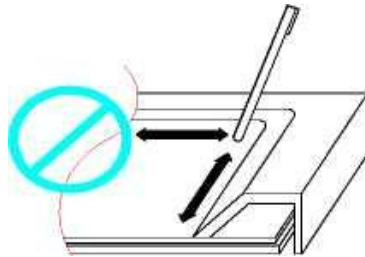
- (1) Damages caused by improper product handling by clients, including and not limited to, damaged caused during shipping or during subsequent application.
- (2) Damage caused by disasters, either by natural causes or human factors, after the delivery of products.
- (3) Any repairs, modifications or disassembling of ALP's products without prior notification to and the consent of ALP.

13. CAUTIONS

Storage	(1) Store packaged products specified temperature and humidity. Do not expose products to long term direct sunlight. Do not stack packaged product such as to impose mechanical stress on these items.
Unpacking	(1) Check for the correct vertical orientation of the package before unpacking.
Handling	(1) Clean finger stalls or gloves are required during handing to prevent finger-prints or contamination of the products and possible cuts caused by sharp edges. (2) Do not handle the viewing area of the panel. (3) Do not handle the panel at the tail (connector) to prevent detachment of the tail from the panel.
Cleaning	(1) Clean with soft clothes using mild detergent or with alcohol. (2) Do not use chemical solvents, acidic or alkali solutions. (3) Do not permit ingress of liquids into the edge area of the touch-screen.
Installing and Assembling	(1) Excessive force or strain to the panel or the tail may result failure of these items. (2) Provide a clearance of at least 0.3mm between panel and display module. (3) It is essential that great care be taken to design mounting hardware that provides good seals that prevent front surface contaminants from accessing the edges and rear of the panel. Further, it is important that soft adhesives be employed and that panel glass edges not impact metals used in the enclosure.
Operating	(1) Operate with a stylus (tip R0.8 mm or over), or with a finger without applying excessive load. Sharp edged or hard stylus material are prohibited. (2) The internal condensation in the panel may occur with abrupt temperature or humidity changes (dependent on application installation design).
Others	(1) Keep the touch/viewing surface clean at all times to minimise scratching due to abrasive contamination during touch operations. No adhesives should be applied. (2) Avoid high voltage and static discharge. (3) ALP reserves the right to substitute materials with the same grade and specification.

絕對禁止沿著機殼四周邊緣作畫線動作如此會令 PET/FILM 因承受極大的壓力而破壞，更會因此而得 Touch Panel 喪失功能。如圖。

It is absolutely forbidden to draw lines along with the edge of the housing because the extreme force will damage the PET/FILM and cause the failure of the touch panel.



14. APPENDIX I: Appearance Specifications

Particle	(1) Diameter \leq 0.25 (each area contains \leq 2 particles, total \leq 5 particles) → OK (2) 0.25<Diameter \leq 0.3 (each area contains \leq 2 particles, total \leq 5 particles) → OK (3) Diameter>0.3 → NG
Blur Stain	(1) Diameter \leq 0.25 (each area contains \leq 2 particles, total \leq 5 particles) → OK (2) 0.25<Diameter \leq 0.3 (each area contains \leq 2 particles, total \leq 5 particles) → OK (3) Diameter>0.25 → NG
Linear Object	(1) Widths \leq 0.05 and Length \leq 12 → OK (2) 0.05<Width \leq 0.1 and Length \leq 5, total \leq 3 objects → OK (3) Width>0.1 and Length>0.2 → NG (4) Curled objects are regarded as particles
Blister	(1) As per actual samples provided
Fish Eye (Spread White Spots)	(1) Diameter \leq 0.5 → OK (2) Diameter>0.3 → NG (3) Each area contains \leq 3 spots, totals \leq 5 spots → OK
Newton Ring	(1) As per actual samples provided
Color Tone	(1) As per actual samples provided
Scratch	(1) 0.05< Width \leq 0.1 and Length \leq 12, total \leq 5 scratches → OK (2) Width>0.1 or Length>12 → NG
Interference Pattern	(1) Inspection according to the standard testing methods
Damages to Glass A. Comer B.	(1) Length \leq 2, Width \leq 2, Depth \leq 1/3T, Total \leq 2 damages → OK (2) Propagating cracks are not allowed

15. APPENDIX II: General Specification and Product Selection Guide of Trio-RT

4-wired Trio resistive touch panel								
Size	Part Number	Frame Area	Viewing Area	Active Area	Tc	Tail Connector	Tail Length	Tail Location
2.5"	TRIORT025P4	63.50 x 41.50	56.00 x 34.00	54.40 x 32.40	1.90	ZIF	19.50	10 O'clock
3.0"	TRIORT030P4	70.00 x 55.00	61.50 x 47.60	60.10 x 46.20	1.50	ZIF	30.00	3 O'clock
3.5"	TRIORT035P4	82.50 x 63.20	71.50 x 56.50	73.00 x 54.00	1.85	ZIF	20.00	5 O'clock
3.9"	TRIORT039P4	69.50 x 89.50	60.98 x 80.90	59.98 x 79.90	1.60	ZIF	20.00	10 O'clock
4.0"	TRIORT040P4	90.00 x 70.00	81.40 x 61.00	78.00 x 59.00	1.95	ZIF	22.00	4 O'clock
5.8"	TRIORT058P4	137.50 x 107.00	122.60 x 93.80	116.20 x 87.30	1.85	AMP	79.10	9 O'clock
6.4"	TRIORT064P4	152.90 x 120.00	135.60 x 102.60	130.60 x 98.40	1.85	AMP	79.10	9 O'clock
7.0"	TRIORT070P4	169.50 x 106.00	158.00 x 95.00	154.00 x 92.00	2.00	AMP	80.00	11 O'clock
7.5"	TRIORT075P4	180.90 x 143.00	162.90 x 124.40	155.90 x 117.40	2.30	AMP	116.00	10 O'clock
8.4"	TRIORT084P4	183.40 x 139.55	173.80 x 131.20	172.40 x 129.80	1.85	AMP	80.00	10 O'clock
10.4"	TRIORT104P4	231.40 x 174.00	214.50 x 162.00	212.00 x 159.20	1.85	AMP	80.00	9 O'clock
12.1"	TRIORT121P4	268.50 x 201.50	253.50 x 189.00	245.00 x 183.00	2.75	AMP	80.00	10 O'clock
14.1"	TRIORT141P4	302.00 x 234.00	288.70 x 217.70	284.70 x 213.70	2.75	AMP	116.50	7 O'clock
15.0"	TRIORT150S4	330.50 x 255.50	311.00 x 235.00	303.00 x 227.00	2.75	AMP	80.00	9 O'clock
17.0"	TRIORT170S4	366.00 x 289.00	346.00 x 276.00	338.00 x 268.00	3.90	AMP	80.00	3 O'clock
18.1"	TRIORT181S4	388.61 x 308.61	366.00 x 293.20	359.00 x 287.20	3.90	AMP	250.00	9 O'clock
5-wired Trio resistive touch panel								
Size	Part Number	Frame Area	Viewable Area	Active Area	Tc	Tail Connector	Tail Length	Tail Location
6.4"	TRIORT064P5	156.46 x 122.94	136.05 x 104.04	130.05 x 98.04	2.70	AMP	190	9 O'clock
10.4"	TRIORT104P5	231.65 x 174.24	213.87 x 161.04	211.58 x 158.75	2.70	AMP	190	9 O'clock
12.1"	TRIORT121P5	271.00 x 205.50	252.50 x 190.50	248.00 x 185.00	2.70	AMP	190	9 O'clock
15.0"	TRIORT150P5	323.59 x 245.20	306.96 x 232.16	304.04 x 228.09	1.85	AMP	190	9 O'clock
17.1"	TRIORT171S5	365.50 x 290.32	349.50 x 278.12	340.10 x 272.54	2.70	AMP	190	9 O'clock

Note1. Engineering design services to implement customized solutions are available. A minimum NRE fee may be payable to customize a touch panel solution.

Note2. Indicated Tt (Total Thickness) is based on standard glass currently used in production of the panel. Other thickness of glass and chemically tempered glass are also available per request.