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# **Dawar Technologies**

## **4 and 8-Wire Resistive Touch Screen Specifications**

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# 1 Product Features:

- 1.1 Type: 4 and 8- Wire Analog Resistive Touch Screen
- 1.2 Construction: Film on Glass (FG) or Polyester Laminated (PL) Touch Screen
- 1.3 Input Methods: Finger, Pen or Stylus
- 1.4 Connector: FPC

# 2 Specifications

## 2.1 Electrical

- 2.1.1 Maximum Voltage: 5V DC
- 2.1.2 Maximum Current: Top Layer: 35mA  
Bottom Layer: 35mA
- 2.1.3 Loop Resistance: Top Layer: 100-900Ω (FG/PL 4:3 aspect ratio)  
Bottom Layer: 100-900Ω  
Top Layer: 100-1050Ω (FG/PL wide aspect ratio)  
Bottom Layer: 100-1050Ω
- 2.1.4 Insulation Impedance: >20MΩ @25V DC
- 2.1.5 Linearity: ≤ 1.5%
- 2.1.6 Chattering Time: ≤ 15ms

## 2.2 Mechanical

- 2.2.1 Operation Force: 10g-100g
- 2.2.2 Surface Hardness: ≥ 3H

## 2.3 Optical

Light Transmission, Haze and Clarity: ASTM D1003.Wavelength=550nm (FG)  
ASTM D1003.Wavelength=550nm (PL)

| Structure              | Transmission<br>(+/- 3%) | Haze<br>(+/- 2%) | Clarity<br>(+/- 2%) |
|------------------------|--------------------------|------------------|---------------------|
| Film Glass CH/ANR      | 80%                      | 7%               | 85%                 |
| Film Glass AG/ANR      | 80%                      | 10%              | 78%                 |
| Film Film Glass CH/ANR | 70%                      | 14%              | 75%                 |
| Film Film Glass AG/ANR | 70%                      | 19%              | 69%                 |

## 2.4 Environment & Storage Conditions (FG+PL)

- 2.4.1 Operating Temperature & Humidity: -20°C ~ +60°C, < 90 %RH  
non-condensing for the product

2.4.2 Storage Temperature & Humidity: -20°C ~ +70°C

## 2.5 Reliability

2.5.1 Pen Hitting Durability: > 1,000,000 (4-Wire)  
> 5,000,000 (8-Wire)

2.5.2 Pen Sliding Durability: > 100,000 (4 & 8 Wire)

## 3 Testing Condition

### 3.1 Scope

The standard testing environment is 23°C, 65 %RH and 1013 HPa. The testing shall be done at normal temperature (5°C to 35°C) and humidity (45%RH to 85%RH) with normal atmospheric pressure (860HPa to 1060HPa).

### Mechanical

#### 3.1.1 Pen Hitting Durability

1. 4-wire Resistive Type: Tapping more than 1million times with 250g load and 2 touches per second frequency by an Ø2mm 60° rubber testing pen.
2. 8-wire Resistive Type: Tapping more than 5 million times with 250g load and 2 touches per second frequency by an Ø2mm 60° rubber testing pen.

#### 3.1.2 Pen sliding Durability

(Note: The sliding testing area should be in the active area and more than 3mm from boundary of active area.)

1. 4-wire Resistive Type: Sliding more than 100 thousand times with 250g load and 60mm per second frequency on the same location (10-100mm) with an Ø2mm polydactyl pen.
2. 8-wire Resistive Type: Sliding more than 100 thousand times with 250g load and 60mm per second frequency on the same location (10-100mm) with an Ø2mm polydactyl pen.

#### 3.1.3 Pen Hitting Durability

1. 4-wire Resistive Type: Tapping more than 1million times with 250g load and 2 touches per second frequency by an Ø2mm 60° rubber testing pen.
2. 8-wire Resistive Type: Tapping more than 5 million times with 250g load and 2 touches per second frequency by an Ø2mm 60° rubber testing pen.

#### 3.1.4 Impact Resistance

Testing condition - No glass breaks when 64g, Ø 25.4mm steel ball is dropped vertically on the center of panel surface from 12-80cm height at 1 time for 0.7-3.0mm thickness glass. Sample to be tested is only for Film + Glass type.

(Note: Testing height would be increased by 10cm height for steel ball dropping

vertically in our company, and make record for the height when glass breaks)

### 3.1.5 Tail Bend

1. FPC Type:  $\geq 3.3\text{mm}$  diameter
2. Integral Type: 8.0mm diameter.
3. ZIF connection: A stiffener is applied to the opposite side of the contact area for a ZIF connection. This stiffener should not be creased or bent.

### 3.1.5 Chemical Resistance – ASTM F1598

| Household Chemicals  |
|--|
| Tea, Coffee, Ketchup, Mustard, Vinegar, Soy sauce, Beer, Red Wine, White Wine, Coca-Cola, Cooking Oil, Laundry Detergent, All Purpose Cleaner, Bleach, Dishwashing Liquid, Window Cleaner, Hydrogen Peroxide (3%), Lysol, Ethyl Alcohol, Isopropyl Alcohol   |
| Industrial Chemicals   |
| Acetone, Methyl Ethyl Ketone, Toluene, Iso Alcohol 70%, Concentrated Hydrochloric Acid, Naptha, Mineral Spirits, Gasoline, Motor Oil, Diesel Fuel, Transmission Fluid, Brake Fluid, Heptane, Sodium Hydroxide, Ethanol, Turpentine, Diethylene Glycol Mon ethyl Ether, Acetate, Petroleum Ether, Antifreeze, Hydraulic Oil |

## 3.2 Electrical

### 3.2.1 Loop Resistance

Test both ends of circuit loop for the maximum loop resistance with multi-meter (5V). The loop resistance must be less than the specification noted above.

### 3.2.2 Insulation Impedance

Test the insulation impedance by either High Voltage Testing Machine (Setting on 20M $\Omega$  or Insulation Meter (25V). The insulation impedance must be more than the specification noted above.

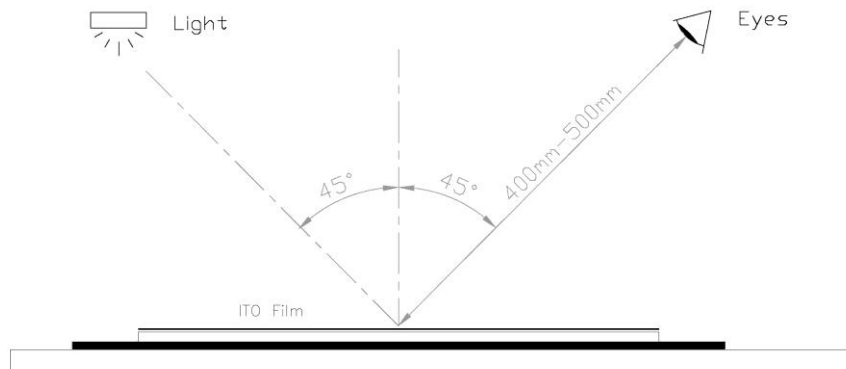
### 3.2.3 Linearity (For Analog Type only)

Use Linearity Testing Instrument. The test result must be  $\leq 1.5\%$ .

## 4 Appearance Criteria

**Viewable Area Definition:** Viewable Area is defined as the area of the touch panel through which the display appears.

**Inspection conditions:** Place touch panel on a flat surface with black background. Under ambient cool white fluorescent lighting source of 12-20W with view distance of 400-500mm from touch panel, inspect (see the picture as below). Inspection time is 10 seconds minimum for each piece:



## 4.1 Appearance Inspection Criteria

### 4.1.1 Opaque Spot

Note: D=Diameter; L=Length; W=Width; GT=Glass Thickness

| Criteria                                  | Comment  |
|---|--|
| $D < 0.13\text{mm}$                       | Ignored  |
| $0.13\text{mm} \leq D \leq 0.38\text{mm}$ | If spot or inclusion is larger than 10mm in distance from another one, then it can be ignored<br>If spot or inclusion is less than 10mm in distance from another one, then two are allowed |
| $D > 0.38\text{mm}$                       | The touch screen is regarded as a defect   |

### 4.1.2 Linear Defect

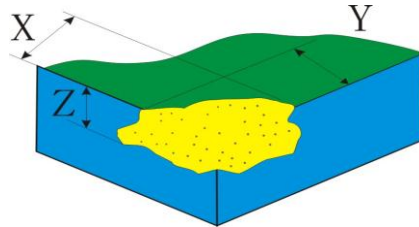
| Criteria                                    | Comment   |
|---|---|
| $W < 0.025\text{mm}$                        | Ignored   |
| $0.025\text{mm} \leq W \leq 0.035\text{mm}$ | $L \leq 2\text{mm}$ , Linear defect that is $> 10\text{mm}$ in distance from any other one can be ignored |
| $0.035\text{mm} < W < 0.05\text{mm}$        | $L < 1.5\text{mm}$ , Linear defect that is $< 10\text{mm}$ in distance from any other one two are allowed |
| $W > 0.05\text{mm}$                         | Touch screen is regarded as defect  |

### 4.1.3 Chip and Crack

**Corner Fragment:**  $X \leq 3.0\text{mm}$  and  $Y \leq 3.0\text{mm}$  and  $Z \leq \text{GT}$  it is ignored

1) Corner fragment on the tail cable area which will seriously affect the product function is regarded as a defect.

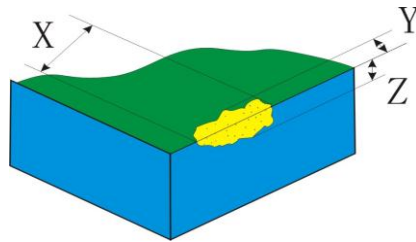
2) Corner fragment on the circuit which will seriously affect product function is regarded as a defect



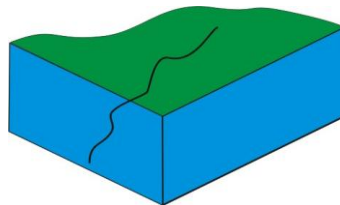
**Side Fragment:**  $X \leq 4.0\text{mm}$  and  $Y \leq 2.0\text{mm}$  and  $Z \leq \text{GT}$  it is ignored

1) Side fragment on the tail cable area which will seriously affect the product function is regarded as a defect.

2) Side fragment on the circuit which will seriously affect product function is regarded as a defect.



**Progressive:** T/P is regarded as defect.

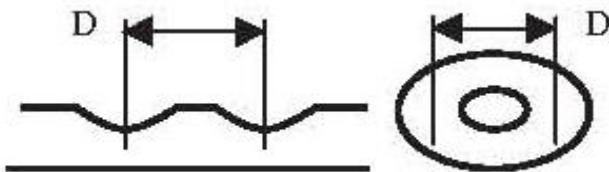


### 4.1.4 Scratch



| Criteria                                  | Comment   |
|---|---|
| $W < 0.03\text{mm}$                       | $L \leq 5\text{mm}$ the defects are ignored   |
| $0.03\text{mm} \leq W \leq 0.05\text{mm}$ | $L \leq 5\text{mm}$ , Defect that is greater than 10mm in distance from another one is ignored<br>$L \leq 5\text{mm}$ , Defect that is less than 10mm in distance from another one is regarded as a defect<br>$L > 5\text{mm}$ touch screen is regarded as a defect |
| $W > 0.05\text{mm}$                       | Touch screen is regarded as a defect.   |

#### 4.1.5 Fish Eye, Dent and Air Bubble

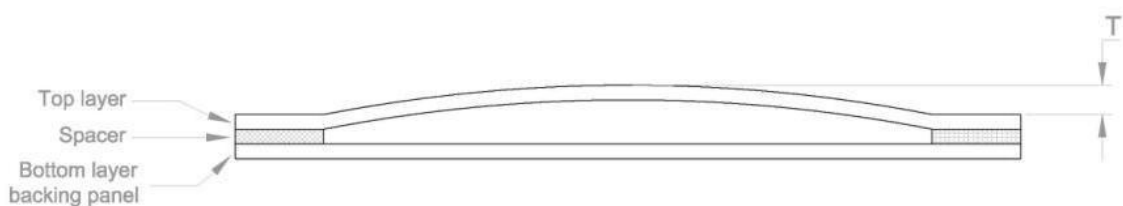


|                    |           |
|--------------------|-----------|
| $D \leq 0.2$       | Ignored   |
| $0.2 < D \leq 0.4$ | 5 or less |
| $0.4 < D \leq 0.5$ | 2 or less |
| $D > 0.5$          | Zero      |

$D$  (mm): Average Diameter = (Long diameter + Short diameter)/2

#### 4.1.6 Pillowing

After testing 24 Hour at 60°C/90% RH, the pillowing and/or wrinkles should be as specified as below on room condition.



| Touch Screen Size | $\leq 2.8''$     | $2.8'' \sim 10.4''$ | $10.4'' \sim 15''$ | $\geq 15''$      |
|-------------------|------------------|---------------------|--------------------|------------------|
| Tolerance (T)     | $< 0.2\text{mm}$ | $< 0.3\text{mm}$    | $< 0.4\text{mm}$   | $< 0.6\text{mm}$ |

#### 4.1.7 Rippling

Rippling is visible waviness of the top layer in a specific, limited area ( $< 50\%$ ) of the surface area of the top sheet. No more than two ripples allowed per part. Ripple is measured by the nominal substrate flatness in comparison to the height of the ripple (see table below).

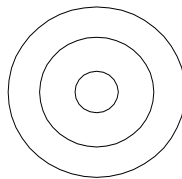
| Diagonal Size (Active Area) | Specification    |
|-----------------------------|------------------|
| Up to 12.1" part            | ≤ 0.18mm allowed |
| 12.2" and larger part       | ≤ 0.25mm allowed |

#### 4.1.8 Newton Ring

Visual inspection shall be done at a distance of 300mm between eyes and touch screen with an angle of  $60^\circ \pm 10^\circ$  to the surface of the product under a fluorescent light (40 W, natural color).

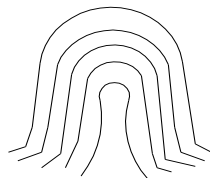
There are two kind of Newton Rings:

1. Regular:



- a. When Newton ring dimension is more than 1/3 of sample dimension (Sample dimension means the visual area dimension) it is regarded unacceptable.
- b. When Newton ring dimension that is less than 1/3 of sample dimension and does not causes font and line distortion under fluorescent light, it is acceptable

2. Irregular:



- a. If Newton ring dimension is more than 1/2 without lighting; it is regarded unacceptable.
- b. If Newton ring causes font and line distortion under fluorescent light, it is regarded unacceptable.
- c. When Newton ring dimension is less than 1/2 of sample dimension and the Newton ring does not cause font and line distortion under fluorescent light, it is acceptable.

## 5 Reliability Testing Condition

5.1 The Operating requirements in Section 2.4 shall be satisfied after completion of the following:

- 5.1.1 Samples exposed to 250 hours at  $-30^\circ\text{C}$ . Each sample is tested to the specifications in sections 2.1 through 2.3 after allowing the samples to acclimate at room temperature and humidity for at least 4 hours.
- 5.1.2 Samples exposed to 250 hours at  $60^\circ\text{C}/90\%\text{RH}$  (non-condensing).



Each sample is tested to the specifications in sections 2.1 through 2.3 after allowing the samples to acclimate at room temperature and humidity for at least 4 hours.

5.2 The Storage requirements in Section 2.4 shall be satisfied after completion of the following:

- 5.2.1 Samples exposed to 500 hours at -40°C. Each sample is tested to the specifications in sections 2.1 through 2.3 after allowing the samples to acclimate at room temperature and humidity for at least 4 hours.
- 5.2.2 Samples exposed to 500 hours at +70°C. Each sample is tested to the specifications in sections 2.1 through 2.3 after allowing the samples to acclimate at room temperature and humidity for at least 4 hours.
- 5.2.3 Samples exposed for 250 hours to +70°C/90%RH (non-condensing). Each sample is tested to the specifications in sections 2.1 through 2.3 after allowing the samples to acclimate at room temperature and humidity for at least 4 hours.
- 5.2.4 Thermal Cycling: Test samples for 25 cycles with each cycle consisting of the following protocol: The test begins at room temperature (25°C) and ramps to 70°C within 30 minutes and dwells at 70°C for 1 hour, and then ramps back to room temperature within 30 minutes. The test then ramps down to -40°C within 30 minutes and dwells for 1 hour before ramping back to room temperature. Each sample is tested to the specifications in sections 2.1 through 2.3 after allowing the samples to acclimate at room temperature and humidity for at least 4 hours.

## 6 Handling and Packing

The resistive touch screen is traditionally a glass product so please handle the touch screen with care. Keep touch screen surfaces clean and free of any dust and dirt because small particles could scratch the touch screen. To prevent accidental damage to the product, please follow the instructions below when handling the touch screen. Mishandling product violates the warranty.

### 6.1 Storage

- 1. Store the touch screen under the temperature and humidity range specified above. Direct sunlight exposure should be avoided.
- 2. Please ensure the front surfaces of touch screen are properly protected before stacking them.
- 3. Do not put heavy objects on the touch screen, and do not stack or pile touch screens.

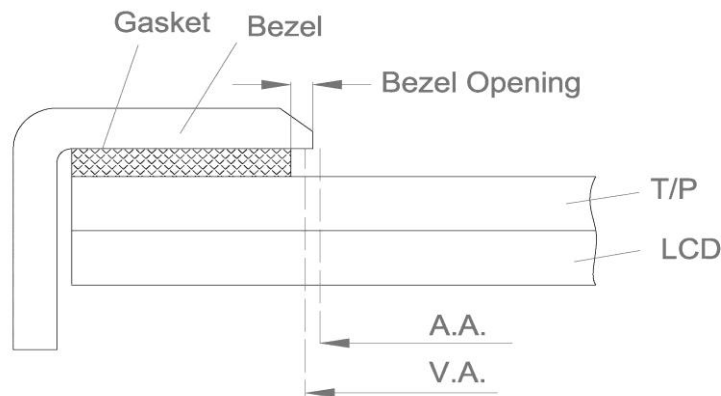
### 6.2 Handling

- 1. Touch screens are traditionally glass products. Please wear gloves when handling touch screen to avoid injury. Hold the touch screen outside the viewable area when handling the panel to prevent any fingers prints or stains before installation.

2. Avoid touching the viewing area. Transparency is an important factor for the product. Wear clean finger sacks, gloves and mask to protect the products from fingerprint or stain.
3. Do not hold the product by the tail.
4. Tail cable must not be bent to less than 1.5mm radius when handling and assembly.
5. Use a soft lint-free cloth dampened with isopropyl alcohol to clean any contaminates on the touch screen.

### 6.3 Installing and Assembly

1. We suggest customer add gasket or cushion around touch panel outside of viewable area when design the unit to prevent water or dirt contamination. The following picture shows general layout of the display unit.



2. The gap should be remained between touch panel and bezel to avoid any unnecessary pressing accidentally on the touch panel.
3. Bezel opening should be designed between Viewable area and Active area and avoid bezel touches touch panel.
4. When integrating, avoid excessive pressure on the tail bond area of the FPC tail.
5. When the touch screen is mounted on the LCD/other display with double-sided tape etc., place enough pressure onto the non-active area of the touch panel so that neither exfoliation nor gap may take place between the touch panel and LCD/other display. When assembling, please apply even pressure on the corners and four sides of a touch panel.

### 6.4 Operating

A finger or stylus must be used to interface with the product. Any sharp instruments or hard objects should not be used. Operate the touch screen in a steady environment. Any abrupt variations in temperature and humidity may cause the touch screen to malfunction.

## 7 Warranty Periods

Dawar warrants the products produced to this specification after the date of shipment as below:

|  |        |
|--|--------|
| Resistive FG 4 and 8 Wire Flat Touch Screen: | 1 year |
| Resistive PL 4 and 8 Wire Flat Touch Screen: | 2 year |

If the product fails in the warranty period, Dawar is obligated to repair or replace that product quantity or to refund its purchase price. Please reference Dawar terms and conditions at <http://www.dawar.com/download/termsofsale.pdf> Dawar has no obligation to any product that has been modified or damaged through misuse, accident, neglect, or subsequent manufacturing operations or assemblies by anyone other than Dawar. The information in this document is subject to change without notice.