

# TOUCHSCREEN INCOMING INSPECTION STANDARD

VER. 10.6.0

All 4-wire models except as noted in individual spec. Sheets

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Approved

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_/\_\_\_\_\_  
Company Date

**ATTENTION: REGARDING STYLUS APPLICATIONS**

**NOTE:** If your application calls for the use of a stylus or similar input device, you must use double layer film or **WARRANTY IS VOID**. If uncertain about your method of input, please contact us.

We have found that many users of stylus applications have a tendency to press the stylus too hard, causing a breakdown of the resistive coating on the flexible top layer. This leads to improper operation and eventual touch screen failure. Applications such as signature capture, or using a scroll bar near the edges of the touch screen are the leading cause of this problem.

Double layer film is available for ALL HantouchUSA 4-wire analog resistive touch screens.

**Product that has been mounted and removed is not returnable for cosmetic defects; scratches, chips or cracks**

**ATTENTION: REGARDING HIGH-RISK APPLICATIONS**

The Products have not been designed, manufactured, tested or qualified for use in any high-risk application (a "High-Risk Application"), including, but not limited to, the following: life support or life sustaining, "medical device" as defined by applicable law, nuclear, vehicle control (including airplane, automotive, train and other vehicle) or any other application in which failure of the Product, or the product into which it is incorporated, could foreseeably result in personal injury, death, or significant property damage.

To contact us, please call us at 425.774.8151 or  
send email to [sales@hantouchUSA.com](mailto:sales@hantouchUSA.com)  
Visit us on the web at [www.hantouchUSA.com](http://www.hantouchUSA.com)

## INSPECTION AND WARRANTY

### Inspection

**Within 30 days after delivery** customer will inspect the products and give written notice of rejection to Hantouch USA detailing the manner in which any products do not conform to specifications. Upon receiving authorization and shipping instructions from Hantouch USA, customer may return rejected products. If the customer retains the products after their delivery without giving Hantouch USA such notice within the designated period, customer will be deemed to have irrevocably accepted the products. Customer's inspection and acceptance tests shall not exceed the inspection and test procedures customary in the industry for the products and shall be at customer's expense. Hantouch USA may charge to the customer any costs resulting from the testing, handling, and disposition of any products returned by the customer which are not found by Hantouch USA to be non-conforming.

### Warranty

Hantouch USA warrants to customer that the products will be free from defects in material and workmanship under normal use and service for a period of one year from the date of invoice. Customer's exclusive remedy for breach of this warranty is that Hantouch USA will either (i) repair or replace, at its option, any product which fails during the warranty period because of such defect (if customer promptly reported the failure to Hantouch USA in writing) or, (ii) if Hantouch USA is unable to repair or replace, Hantouch USA will refund the purchase price of the product upon its return to Hantouch USA.

This warranty does not apply to any product which has been subjected to misuse, abnormal service or handling, or which has been serviced or repaired by anyone other than Hantouch USA. The warranties set forth herein are in lieu of, and exclusive of, all other warranties, express or implied.

**ALL EXPRESS AND IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE AND FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY EXCLUDED.**

Product that has been mounted and removed is not returnable for cosmetic defects; scratches, chips or cracks.

Hantouch USA reserves the right to make changes in the specifications, Characteristics, data, materials, structures and other contents described herein at any time without notice in order to improve design or reliability. Contact Hantouch USA in order to obtain the latest specification sheets before using any Hantouch USA device. Manufacturing locations are also subject to change.

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1. Scope

This specification is applied to HantouchUSA Product number as listed on page 1.

2. Warranty

Touch Panel products manufactured to this specification shall be warranted for a minimum period of 12 months from the date of shipping from HantouchUSA when stored or used as specified under normal condition within the contents of these sheets. If Touch Panel products are not used or stored as specified herein, it will void the 12 months warranty.

3. Shape

Shape, structure and dimension are defined by the drawing on page 18.

4. Features

Type	4-Wire Analog Resistive Touch Panel	
Input Mode	Finger	
Structure	ITO Film	175/188 $\mu$ m
	ITO Glass	1.1/1.8T
Connector	FPC	

5. Rating

5.1 Maximum Voltage & Current

Less than DC 7 volts, 1ma

- At the contact point of ITO Film (top layer) and ITO Glass(bottom layer)

5.2 Operating Temperature Range

- 20 °C to 60 °C (Humidity : 20% RH to 90% RH)

5.3 Storage Temperature Range

- 30 °C to 70 °C (Humidity : 20% RH to 90% RH)

6. Electrical Characteristics

6.1 Resistance between Lead

Direction "Y" : 100 ~ 1200  $\Omega$

Direction "X" : 100 ~ 1200  $\Omega$

6.2 Linearity

X axis :  $\pm$  1.5%

Y axis :  $\pm$  1.5%

6.3 Insulation Resistance

20 M $\Omega$  or more at DC 25 V

6.4 Chattering Time

10 msec or less at 100k $\Omega$  Pull-up

## 7. Mechanical Characteristics

### 7.1 Input Method

- Finger

### 7.2 Actuation Force

- Finger : 250 g or less (R 8.0 HS40° Silicon Rubber)

### 7.3 Surface Hardness

- 3H or more (according to JIS-K5400)

## 8. Optical Characteristics

### 8.1 Transmittance

80 % or more

Measurement by SpectroPhotometer MINOLTA CM-3500d

## 9. Reliability

### 9.1 High Temperature Test

Touch Panel is put into a vessel at 80 °C for 240 hours.  
Then it is left at room temperature for 24 hours or more.  
The measurement must satisfy the following :

- Resistance between terminals : According to Section 6.1
- Linearity : According to Section 6.2
- Insulation Resistance : According to Section 6.3

### 9.2 Low Temperature Test

Touch Panel is put into a vessel at -40°C for 240 hours.  
Then it is left at room temperature for 24 hours or more.  
The measurement must satisfy the following :

- Resistance between terminals : According to Section 6.1
- Linearity : According to Section 6.2
- Insulation Resistance : According to Section 6.3

## 9.3 Temperature & Humidity Test

Touch Panel is put into a vessel 60°C and 90%RH for 240 hours. Then it is left at room temperature for 24 hours or more. The measurement must satisfy the following :

- Resistance between terminals : According to Section 6.1
- Linearity : According to Section 6.2
- Insulation Resistance : According to Section 6.3

## 9.4 Thermal Shock Test

Touch Panel is put into a vessel at -40°C for 30 minutes And then 80°C for 30 minutes. This process is repeated by 10 cycles. Then it is left at room temperature for 24 hours or more. The measurement must satisfy the following :

- Resistance between terminals : According to Section 6.1
- Linearity : According to Section 6.2
- Insulation Resistance : According to Section 6.3

## 10. Mounted Product

### 10.1 Removed Product

Product that has been mounted and removed is not returnable for Cosmetic defects: scratches, chips or cracks.

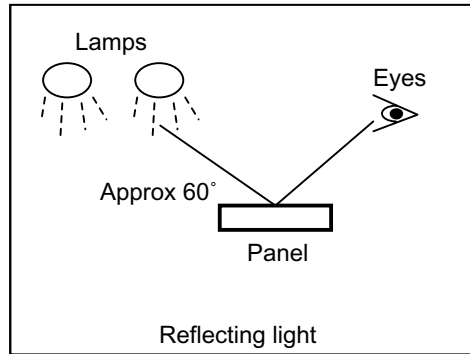
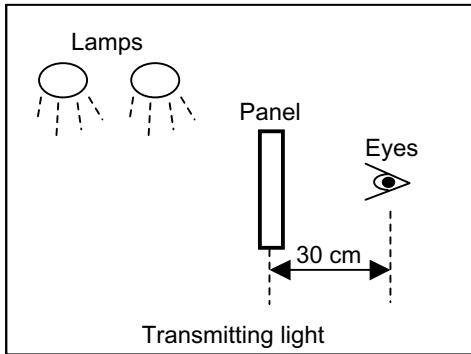
## 11. Cosmetic Inspection Criteria

The following are applied to viewing area.

Any nonvisible defect shall be ignored unless it affects electrical performance.

The Inspection shall be performed by using two 14W fluorescent lamps.

The panel shall be placed 30cm away from eyes as shown below.



### 11.1 Scratch

W less than 0.04mm	In case of $L \leq 10\text{mm}$ , it is disregarded
$0.04\text{mm} < W < 0.06\text{mm}$	In case of $L \leq 10\text{mm}$ , it is disregarded in case the object is in a distance of $L < 15\text{mm}$ from any other objects or scratches. (2 or less) In case of $L > 10\text{mm}$ , it is regarded as defects.
$W > 0.06\text{mm}$	In case $L > 10\text{mm}$ , it is regarded as a defect.

### 11.2 Granular Object


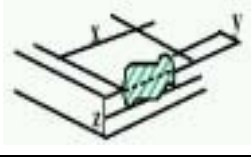
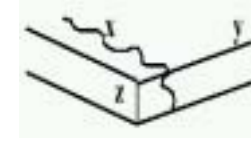
$D \leq 0.25\text{mm}$	Disregarded
$0.25\text{mm} < D \leq 0.40\text{mm}$	It is regarded as a defect in the case the object is in a distance of $< 15\text{mm}$ from any other objects or scratches. (2 or less)
$0.40\text{mm} < D$	It is regarded as a defect.

$D = (X+Y)/2$

### 11.3 Linear Object

$W \leq 0.04\text{mm}$	In case of $L \leq 10\text{mm}$ , it is disregarded
$0.04\text{mm} < W < 0.06\text{mm}$	In case of $L \leq 10\text{mm}$ , it is disregarded in case the object is in a distance of $L < 15\text{mm}$ from any other objects or scratches. (2 or less) In case of $L > 10\text{mm}$ , it is regarded as defects.
$W > 0.06\text{mm}$	In case $L$ is greater than 10mm, it is regarded as a defect.

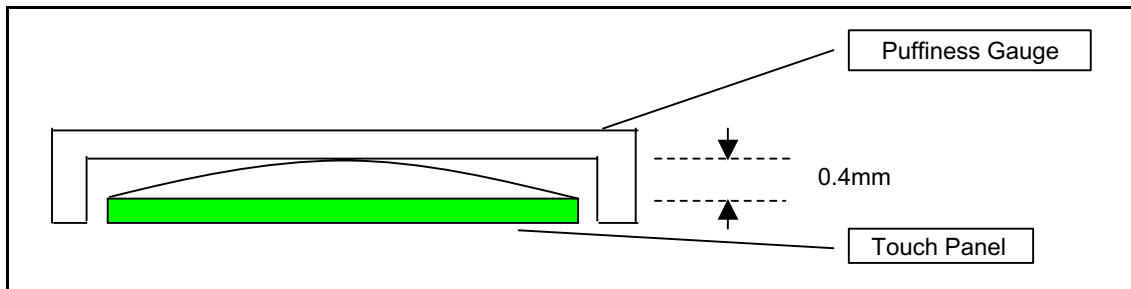
11.4 Glass breakage

	CRITERION & DECISION																	
Corner breakage		$X \leq 3.0\text{mm}$ and $Y \leq 3.0\text{mm}$ and $Z \leq t$ It is ignored																
Side breakage		<table border="1"> <thead> <tr> <th>X(mm)</th> <th>Y(mm)</th> <th>Z(mm)</th> <th>Decesion</th> </tr> </thead> <tbody> <tr> <td><math>\leq 3.0</math></td> <td><math>\leq 3.0</math></td> <td><math>\leq t</math></td> <td rowspan="3">Ignored</td> </tr> <tr> <td><math>\leq 5.0</math></td> <td><math>\leq 1.0</math></td> <td><math>\leq t</math></td> </tr> <tr> <td><math>\leq 5.0</math></td> <td><math>\leq 3.0</math></td> <td><math>\leq 2/3t</math></td> </tr> </tbody> </table>	X(mm)	Y(mm)	Z(mm)	Decesion	$\leq 3.0$	$\leq 3.0$	$\leq t$	Ignored	$\leq 5.0$	$\leq 1.0$	$\leq t$	$\leq 5.0$	$\leq 3.0$	$\leq 2/3t$		
X(mm)	Y(mm)	Z(mm)	Decesion															
$\leq 3.0$	$\leq 3.0$	$\leq t$	Ignored															
$\leq 5.0$	$\leq 1.0$	$\leq t$																
$\leq 5.0$	$\leq 3.0$	$\leq 2/3t$																
Progressive		It is regarded as defective.																

※ t : Glass Thickness

11.5 Puffiness

Check Puffiness with 0.4mm gauge



11.6 Newton's Ring

Subject to limited sample agreed between buyer and manufacturer.

12. Inspection

12.1 Resistance between Lead

Criterion : According to Section 6.1

All the Touch Panels are inspected in the first production lot.  
Sampling inspection from second lot.

12.2 Linearity

Criterion : According to Section 6.2

All the Test Touch Panels are inspected in the first production lot.  
Sampling inspection from second lot.

12.3 Insulation Resistance

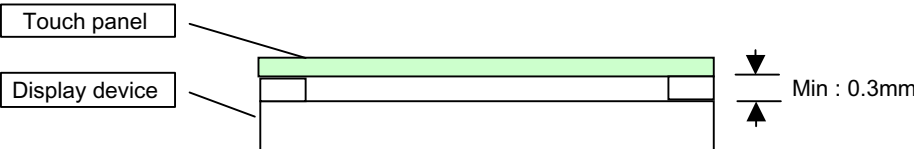
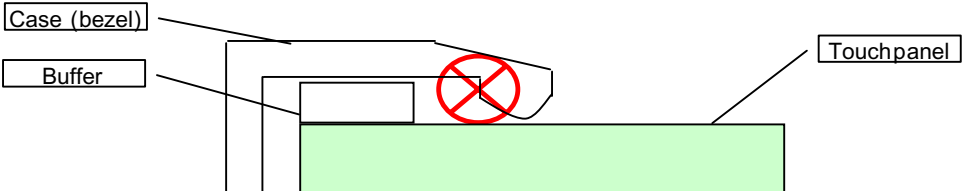
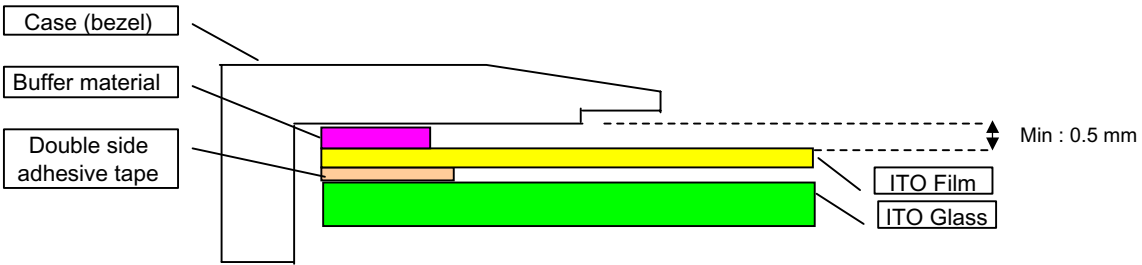
Criterion : According to Section 6.3

All the Touch Panels are inspected in the first production lot.  
Sampling inspection from second lot.

12.4 Appearance

Criterion : According to Section 11

All the Touch Panels are inspected.

13. Handling Remark	
Subject	Description
Storage	<ol style="list-style-type: none"> <li>1. Always store touch panel at Storage Environment. ( Ref. 5.3)</li> <li>2. Do not expose touch panels to direct sunlight.</li> <li>3. Avoid shock and vibration to the product.</li> </ol>
Unpacking	<ol style="list-style-type: none"> <li>1. Open the box after checking the package is right side up</li> <li>2. Do not grip and pull FPC when removing product. (in order to avoid disconnection.)</li> </ol>
	<ol style="list-style-type: none"> <li>1. Use gloves and masks when handling touch panels. (in order to avoid leaving fingerprints or spots.)</li> <li>2. Do not touch where the tails are heat-sealed to avoid disconnection.</li> <li>3. Hold touch panels around outside of viewing area.</li> <li>4. Clean off touch panel with soft cloth dampened with alcohol (IPA) when surface on the panel is dirty</li> <li>5. Do not use organic solvents except alcohol (IPA).</li> <li>6. Do not stack touch panels onto other touch panels. (The edge of the touch panel may cause scratches on the surface of the other touch panels.)</li> <li>7. Do not put heavy objects on the panel.</li> <li>8. Handle with care as the panels have sharp edges.</li> </ol>
Assembly	<ol style="list-style-type: none"> <li>1. Please design a housing which minimizes stress onto touch panels.</li> <li>2. Please pay attention not create any stress to the heat-sealed tails. (Heavy stress may cause disconnection)</li> <li>3. Please pay attention not to harm touch panels with your tools which may be used for assembling.</li> </ol>
Housing Design (Case Design)	<ol style="list-style-type: none"> <li>1. Keep enough clearance (over 0.3mm) between the touch panel and flat-panel display to protect a display device and display surface fig 1.</li> </ol> 
	<ol style="list-style-type: none"> <li>2. Avoid the bezel design as below. Because it can press the 'Active Area' of the touch panel</li> </ol> 
	<ol style="list-style-type: none"> <li>3. We recommend the use of a buffer material between the touch panel and the bezel. and buffer material should be limited only on the busbar area. If it is out of busbar area, touchpanel may occur a short</li> </ol> 
Prohibitions & Operation	<ol style="list-style-type: none"> <li>1. Do not attach bezel to inside of panels viewing area.</li> <li>2. Prevent excessive force on the touch panel.</li> <li>3. Do not use a sharp instrument when operating. This may cause scratches to the touch panel surface</li> <li>4. We recommend calibration after long time use.</li> </ol>

# Touch Panel Integration Guide

<b>DOCUMENT</b>	<i>AR Integration Guide</i>
<b>DEPARTMENT</b>	<i>R&amp;D</i>
<b>WRITTEN BY</b>	<i>R. Pasco</i>
<b>APPROVED BY</b>	
<b>DATE</b>	<i>06/15/2010</i>
<b>VERSION</b>	<i>V 1.10</i>

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## ABOUT THE INTEGRATION GUIDE

This document is intended to be used as a reference only and to provide guidance and cautions related to integrating an Analog Resistive Touch Screen into an enclosure.

The topics and suggestions contained within this document are taken from experience of years working with touch screens. Remember: each situation is different and you may need to adjust some of the following suggestions to best fit your particular application and environment.

Definitions and examples are provided to help illustrate good design practices.

This document does not cover all of the possible methods of touch screen integration, but the general practices apply. Clearances and tolerances are typical with all HantouchUSA touch screens; see individual spec sheets for variances.

## GLOSSARY OF TERMS AND DEFINITIONS

**Activation force**

Force required to push the layers of a touch screen together and register a touch.

**Active area**

Area on a touch screen where a touch will be accurately detected. It is usually smaller than the viewing area.

**Anti-Newton Rings (ANR) Technology**

Top film type that eliminates Newton Rings (see Newton Rings).

**Backing panel**

Rigid substrate for a touch screen, usually glass, can be made of acrylic, etc.

**Buffer layer**

Additional protective layer that is laminated to the top circuit layer to increase durability.

**Buss bar**

Silver ink circuits along the edges of the touch screen. Connects the ITO sensing area to the touch screen tail

**EMI Shielding**

An extra layer of conductive material used to reduce electromagnetic interference (EMI) from passing through the touch screen. Commonly attached to the rear of the touch screen.

**Gasket**

A die-cut layer that is made of polyester, adhesive, foam, or combinations of these materials. A gasket is typically used to seal a touch screen to a bezel, display or both.

**Flat Flex or FPC Circuit (tail)**

A circuit board made of a copper-clad flexible substrate, usually polyamide. Excess copper is etched away, leaving behind the desired circuit. The result is a circuit board that is durable and very flexible. HantouchUSA uses FPC circuits for touch screen tails.

**ITO**

Indium Tin Oxide. A transparent, conductive coating applied to the inside surfaces of touch screen layers.

**Linearity**

A measure of how well a touch screen reproduces a straight line which has been drawn on it.

**Newton Rings**

Optical effects that typically resemble an oil film on water. Caused by light interference that occurs when two or more transparent surfaces are close together.

**Optical Adhesive**

Used to laminate transparent materials such as glass or PET films. Improves optical characteristics of the laminate by removing air gap between the layers. The air gap is where many problems such as glare occur.

**PET (polyester)**

PolyEthylene Terephthalate. A highly durable, flexible material used for the top layer in touch screen construction.

**Pillowing**

A puffiness or bagginess between touch screen layers. Caused by excessive air trapped between layers.

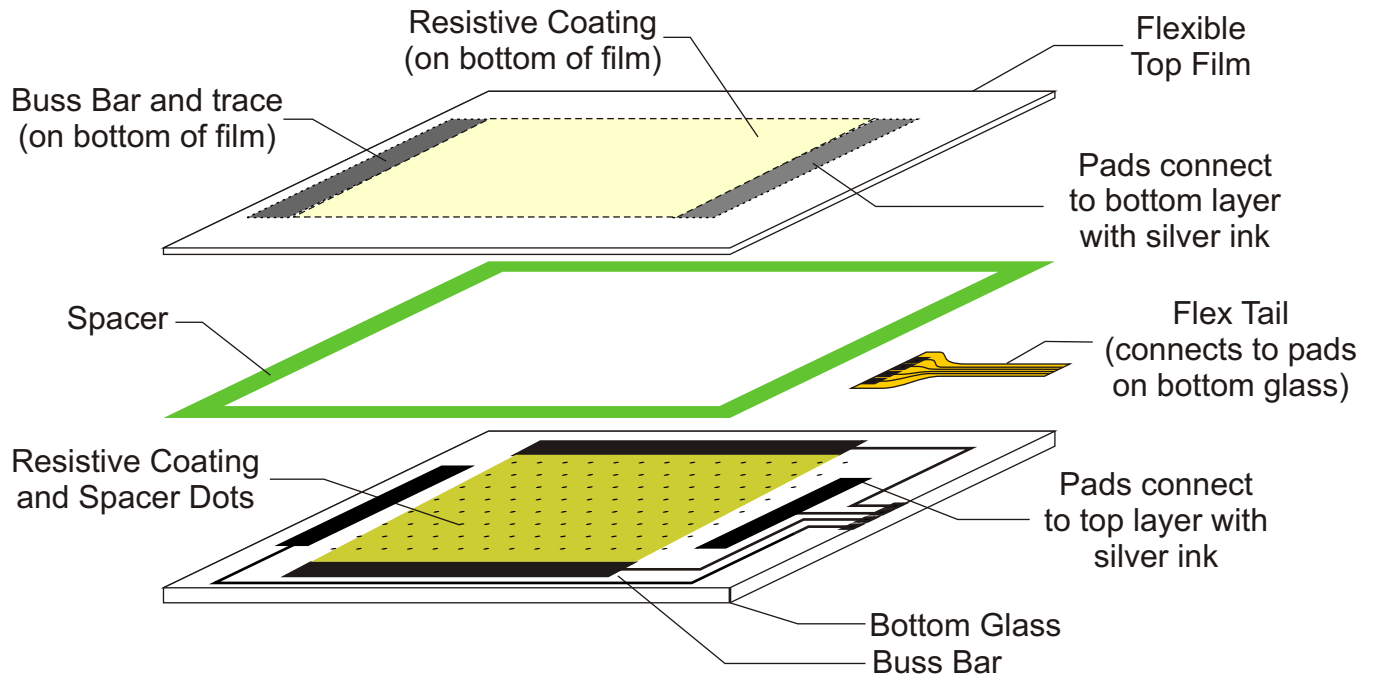
**Spacer dots**

Small, round dots of transparent insulating material that are used to separate the conductive layers in a touch screen until pressed together by a finger or stylus.

**Viewing area**

Area of a touch screen that is clear and can be viewed through. Usually larger than the active area.

Typical Analog Touch Screen Construction

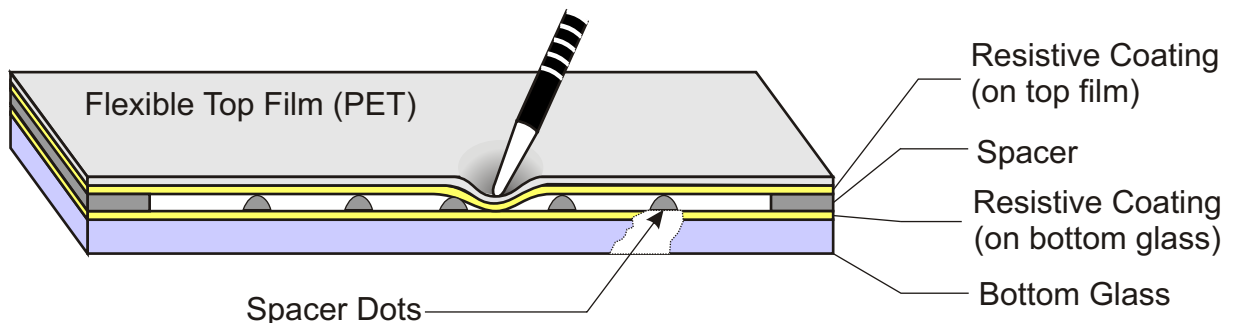


A resistive touch panel is constructed of 2 sheets of material separated slightly by a spacer. A common construction is a sheet of glass providing a stable bottom layer and a sheet of Polyethylene (PET) as a flexible top layer. The spacer may have openings to allow venting.

The two sheets are coated with a resistive substance, usually a metal compound called Indium Tin Oxide (ITO). The ITO is thinly and uniformly sputtered onto both the glass and the PET layer. Nearly invisible bumps called spacer dots are then added to the bottom layer, on top of the resistive ITO coating. The bumps keep the PET film from sagging, causing an accidental or false touch. The amount of pressure needed to cause a "touch event" is largely determined by the size and spacing of the spacer dots.

The Buss Bars and Traces, made of conductive silver ink, connect the ITO layer to the flex tail. The connection may be made with silver ink or a process similar to soldering called heat-seal. Silver ink is again used to connect the top traces to the bottom traces, as needed.

When the PET film is pressed down, the two resistive surfaces meet. The position of this meeting (a touch) can be read by a touch screen controller circuit.



## Attaching Touch Screen to the (LCD) Display.

### Rear Adhesives

To help prevent dust and moisture, we recommend using a rear adhesive between the touch screen and the display. A rear adhesive will also help cushion the touch screen/display assembly from shock and vibration.

Our HantouchUSA rear adhesive uses a strong-bonding adhesive on the touch screen side and on the display side. We can ship the touchscreen with the gasket pre-installed.

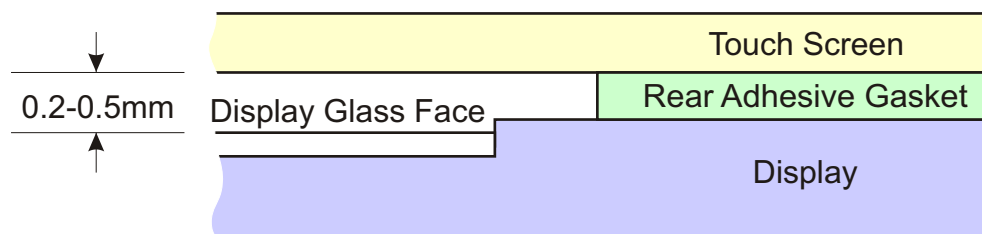
Please visit [www.HantouchUSA.com](http://www.HantouchUSA.com) for information on our rear adhesive gasket.

For optimum viewing and to avoid 'Newton Rings', spacing between the touch screen and the display glass should be 0.2 - 0.5mm. Remember to take into account the thickness of the display's metal housing, if applicable.

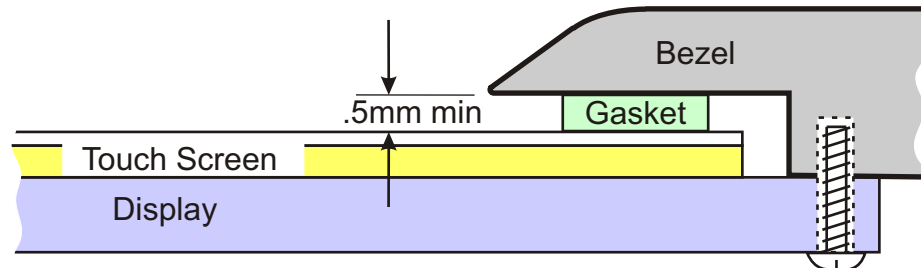
### Mounting the Touch Screen to the Display

Attaching the touch screen to the display must be done in a dust-free environment (class 1000 clean-room) to prevent visible particles from becoming trapped between the touch screen and the display. The light from the display can make dust particles glow brightly.

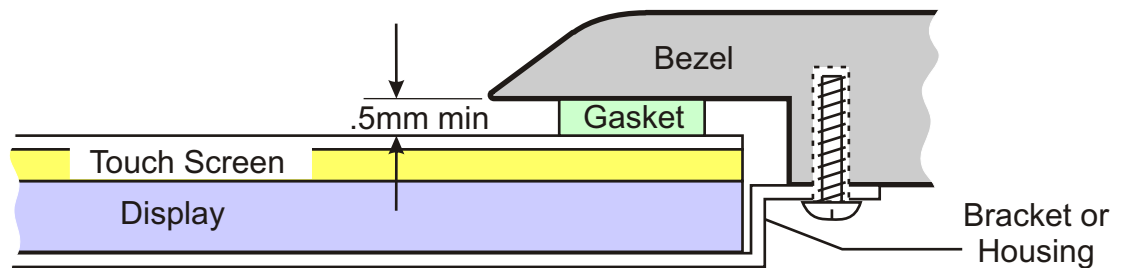
If you do not have clean-room capabilities, HantouchUSA is happy to suggest service providers to perform this work for you.



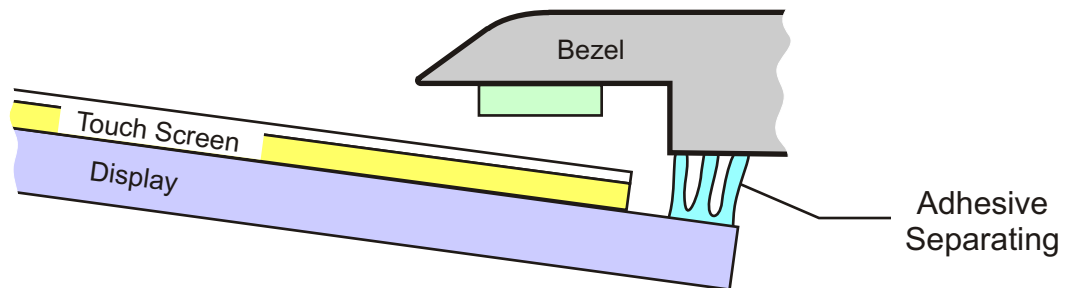
MOUNTING TOUCH SCREEN TO HOUSING BEZEL



If the LCD has mounting holes and the touch screen does not block these holes, the simplest method is to mount the LCD directly to the front bezel.



If the LCD has no mounting holes or if they holes are blocked by the touchscreen, it is recommended that a bracket be added to the LCD for mounting.



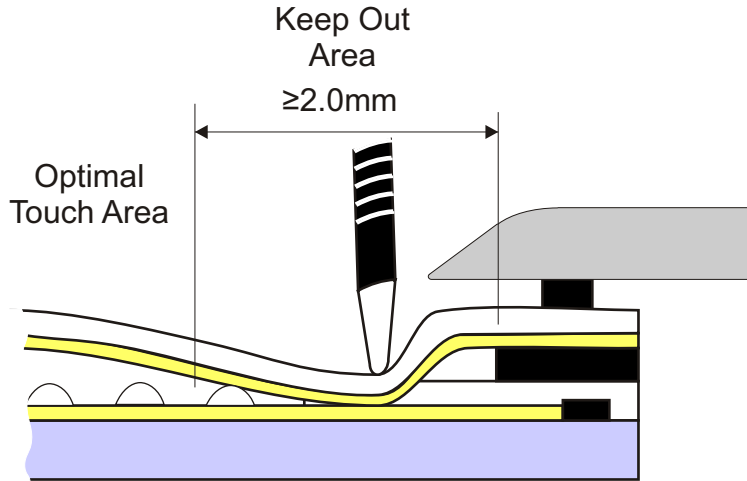
Screws, a clam shell capture arrangement, or other positive locking methods are recommended to insure touch panel stays in place after repeated use. Mounting by adhesive alone is NOT recommended.

Note in the 2 mounting examples, the distance between the touch screen and bezel is determined by a “hard stop” between the LCD panel (or bracket) and the bezel. DO NOT use gaskets or spacers on the front of the touch panel to regulate this gap. The gasket is there ONLY for appearance and to keep out dust and liquids. A large amount of pressure on the touch screen face may result in touch screen failure or inaccurate touches.

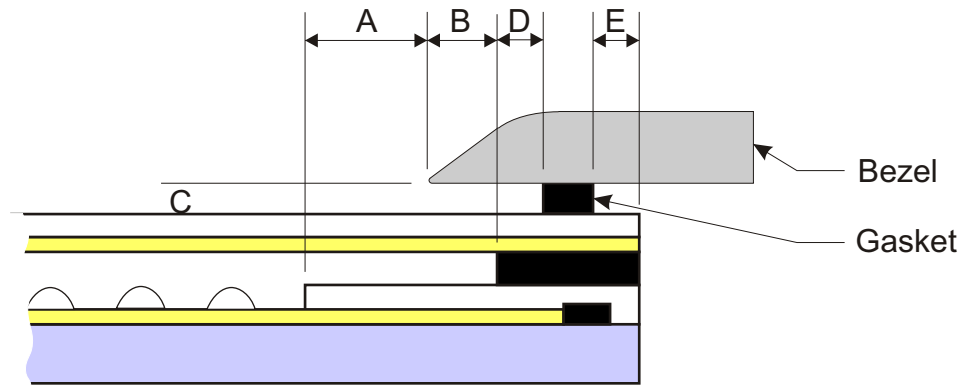
We highly recommend using a foam gasket to prevent dirt or water from entering the enclosure.

Even if you chose not to use a gasket, you must maintain the .5mm min spacing between the face of the touchscreen and the inner face of the bezel. Failure to keep this clearance may result in damage to the touch screen.

CAUTIONS AND TOLERANCES



The above figure illustrates how touches close to the internal spacer can cause the top layer to flex at a sharp angle, cracking the top layer's resistive coating. This cracking may result in reduced touch sensitivity or changes in linearity. Avoid putting buttons or other touch features within 2mm of the internal spacer. Preferably, design your system in such a way that a touch right next to the bezel is 2mm or more from the internal spacer. If this not possible, HantouchUSA offers a special film option to help correct the problem.



A: Bezel Edge to Active Area	1.0mm (min)
B: Bezel Edge to Viewable Area	.8mm (min)
C: Bezel Inner face to Touch Screen Top Layer	.5mm (min)
D: Inner Gasket Edge to Viewable Area	1.0mm min*
E: Outer Gasket Edge to Edge of Touch Screen Top Layer	0.5mm min*

\*may need to increase to take into account gasket thickness, compression ratio and tolerance due to assembly limitations

**NOTES ON DIMENSIONS:**

- A: Prevents false touches due to bezel flexing, dirt accumulation, etc
- B: Provides a cosmetically pleasing bezel design
- C: Prevents touch screen from flexing or twisting due to imperfections in bezel inner face
- D: Prevents false touches due to gasket pressing on flexible area of touch screen
- E: Prevents electrical shorting due to gasket rolling over outer edge of touch screen

## Tail Considerations and Cautions

### **Tail Handling Precautions**

The tail, while not fragile, can be damaged by improper usage and handling.

#### Never Pick up the Touch Screen by Its Tail.

This includes when removing the touch screen from its packaging. Holding by the tail can cause a lot of pressure on the junction of the tail and the touch screen and cause the touch screen to fail.

#### Avoid Twisting the Tail

Twisting the tail can place considerable stress where the tail meets the touch screen.

#### Avoid Touching the Tail Conductors

Touching the tail conductors may contaminate them. This could result in reduced sensitivity or even corrosion.

### **Tail Design Considerations**

#### Tail Bend and Twist

Tail bend radius is 3mm minimum. Design the system to avoid creasing the tail. Avoid twisting the tail. While the tails are very durable, bends and twists can put considerable pressure on the tail and the tail-touch screen junction.

#### Strain Relief

No strain relief is required as long as the bend radius at the touch screen is 3mm. The tail should not place any tension on the top film layer.

#### Noise

Try to avoid routing the tail near any electrically noisy areas such as backlights, high energy coils, etc. The tail could act as an antenna and the noise may reduce sensitivity or give inaccurate touch results.