Series FT

4-Wire Touch Screens with FPC Tails

General Specifications

Electrical Capacity (Resistive Load)
Power Level: 1mA @ 5V DC (resistive load)

Other Ratings
XY Resistive Value: 250 ~ 850Ω; Wide: 120 ~ 1,500Ω
Linearity: ±1.5% maximum
Insulation Impedance: 10MΩ minimum @ 25V DC
Expected Operational Life:
Writing: 50,000 operations minimum (approximately 30mm movement with stylus)
Tapping: 1,000,000 operations minimum (pressing force 4.9N using silicone rubber, hardness 60°)

Touch Activation Force: 1.47N maximum
Chattering Time: 10 milliseconds maximum
Light Transmission: 80% typical (Touch Panel portion)
Surface Hardness: 2H minimum (JIS K5600)

Environmental Data
Operating Temperature Range: -20°C ~ +70°C (-4°F ~ +158°F)
Storage Temperature Range: -40°C ~ +80°C (-40°F ~ +176°F)
Relative Humidity: +60°C (+140°F), humidity 90%, 240 hours

TYPICAL ORDERING EXAMPLE

FT AS 00 - 10.6 A W 4 A

Number of Keys
00 Analog

Screen Size
5.7 5.7”
6.5 6.5”
8.4 8.4”
10.4 10.4”
10.6 10.6”
12.1 12.1”
15 15.0”
15.6 15.6”
19 19.0”

Input Method
A Finger or Stylus

Type
4 4-Wire

Tail
A FPC Tail 1.0mm Pitch

Description for Typical Ordering Example
FTAS00–10.6AW–4A
Wide Type Frame with Horizontal Tail Position
Touch Screen with 10.6” Screen
Finger or Stylus Input
4-Wire Analog
## 4-Wire Touch Screens with FPC Tails

### Series FT

#### PART NUMBERS & DESCRIPTIONS

- **FTAS00-5.7AS-4A**
- **FTAS00-6.5AS-4A**
- **FTAS00-8.4AS-4A**
- **FTAS00-10.4AS-4A**
- **FTAS00-10.4AV-4A**
- **FTAS00-10.6AW-4A**
- **FTAS00-12.1AN-4A**
- **FTAS00-12.1AW-4A**
- **FTAS00-15AN-4A**
- **FTAS00-15.6AW-4A**
- **FTAS00-19AN-4A**

#### 4-Wire Analog Touch Screens

<table>
<thead>
<tr>
<th>Tail</th>
<th>Part Number</th>
<th>Screen Size in Inches</th>
<th>Key Area Dimensions</th>
<th>Viewing Area Dimensions</th>
<th>External Dimensions</th>
<th>Panel Thickness</th>
<th>Terminal Detail</th>
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<tbody>
<tr>
<td>Narrow Frame Type 1</td>
<td>FTAS00-5.7AS-4A</td>
<td>5.7</td>
<td>4.535” x 3.402”</td>
<td>4.764” x 3.606”</td>
<td>5.157” x 3.976”</td>
<td>.055”</td>
<td>Length 2.559”</td>
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<td></td>
<td>FTAS00-6.5AS-4A</td>
<td>6.5</td>
<td>5.197” x 3.898”</td>
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<td>5.906” x 4.567”</td>
<td>.055”</td>
<td>Length 2.559”</td>
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<tr>
<td>Narrow Frame Type 2</td>
<td>FTAS00-8.4AS-4A</td>
<td>8.4</td>
<td>6.728” x 5.102”</td>
<td>6.949” x 5.331”</td>
<td>7.343” x 5.685”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<tr>
<td>Vertical Tail</td>
<td>FTAS00-10.4AS-4A</td>
<td>10.4</td>
<td>8.315” x 6.236”</td>
<td>8.465” x 6.394”</td>
<td>8.882” x 6.748”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<td></td>
<td>FTAS00-10.4AV-4A</td>
<td>10.4</td>
<td>8.354” x 6.276”</td>
<td>8.520” x 6.433”</td>
<td>8.917” x 7.205”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<td></td>
<td>FTAS00-12.1AN-4A</td>
<td>12.1</td>
<td>9.677” x 7.256”</td>
<td>9.827” x 7.406”</td>
<td>10.236” x 7.795”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<td>FTAS00-15AN-4A</td>
<td>15.0</td>
<td>11.972” x 8.980”</td>
<td>12.130” x 9.138”</td>
<td>12.669” x 9.665”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<tr>
<td></td>
<td>FTAS00-19AN-4A</td>
<td>19.0</td>
<td>14.815” x 11.850”</td>
<td>15.039” x 12.102”</td>
<td>15.571” x 12.638”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<tr>
<td>Wide Type Horizontal</td>
<td>FTAS00-10.6AW-4A</td>
<td>10.6</td>
<td>9.071” x 5.441”</td>
<td>9.189” x 5.653”</td>
<td>9.756” x 6.094”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<td></td>
<td>FTAS00-12.1AW-4A</td>
<td>12.1</td>
<td>10.280” x 6.425”</td>
<td>10.404” x 6.551”</td>
<td>10.827” x 6.929”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<td></td>
<td>FTAS00-15.6AW-4A</td>
<td>15.6</td>
<td>13.551” x 7.618”</td>
<td>13.681” x 7.748”</td>
<td>14.276” x 8.433”</td>
<td>.083”</td>
<td>Length 3.150”</td>
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<td>(80.0mm)</td>
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</tbody>
</table>

Narrow Frame: Vertical Tail

Narrow Frame: Horizontal Tail

Wide Frame: Horizontal Tail

Terminal Detail: 4 Pin .039” (1.0mm) Pitch
**Series FT**

**4-Wire Touch Screens with FPC Tails**

### TYPICAL DIMENSIONS

**Vertical Tail**

![Diagram of Vertical Tail]

**Horizontal Tail & Wide Frame**

![Diagram of Horizontal Tail & Wide Frame]

### Typical Dimensions for Vertical Frame

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Screen Size in Inches</th>
<th>Dim A</th>
<th>Dim B Viewable Area</th>
<th>Dim C Active Area</th>
<th>Dim D Active Area</th>
<th>Dim E Viewable Area</th>
<th>Dim F</th>
<th>Dim G Center of Active Area (Horizontal)</th>
<th>Dim H Center of Active Area (Vertical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTAS00-10.4AV-4A</td>
<td>10.4</td>
<td>8.917&quot; (226.5±0.3mm)</td>
<td>8.520&quot; (216.4mm)</td>
<td>8.354&quot; (159.4mm)</td>
<td>6.276&quot; (159.4mm)</td>
<td>5.563&quot; (138.2mm)</td>
<td>6.095&quot; (141.3mm)</td>
<td>4.933&quot; (125.3mm)</td>
<td>3.720&quot; (94.5mm)</td>
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</tbody>
</table>

### Typical Dimensions for Wide Horizontal Frames

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Screen Size in Inches</th>
<th>Dim A</th>
<th>Dim B Viewable Area</th>
<th>Dim C Active Area</th>
<th>Dim D Active Area</th>
<th>Dim E Viewable Area</th>
<th>Dim F</th>
<th>Dim G Center of Active Area (Horizontal)</th>
<th>Dim H Center of Active Area (Vertical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTAS00-10.6AW-4A</td>
<td>10.6</td>
<td>9.756&quot; (247.8±0.3mm)</td>
<td>9.189&quot; (233.4mm)</td>
<td>9.071&quot; (230.4mm)</td>
<td>5.441&quot; (138.2mm)</td>
<td>5.563&quot; (141.3mm)</td>
<td>6.095&quot; (154.8±0.3mm)</td>
<td>4.933&quot; (125.3mm)</td>
<td>2.984&quot; (75.8mm)</td>
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<tr>
<td>FTAS0012.1AW-4A</td>
<td>12.1</td>
<td>10.827&quot; (275.0±0.3mm)</td>
<td>10.404&quot; (264.26mm)</td>
<td>10.280&quot; (261.12mm)</td>
<td>6.425&quot; (163.2mm)</td>
<td>6.551&quot; (166.4mm)</td>
<td>6.929&quot; (176.0±0.3mm)</td>
<td>5.468&quot; (138.89mm)</td>
<td>3.465&quot; (88.0mm)</td>
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<tr>
<td>FTAS0015.6AW-4A</td>
<td>15.6</td>
<td>14.276&quot; (362.6±0.3mm)</td>
<td>13.681&quot; (347.5mm)</td>
<td>13.551&quot; (344.2mm)</td>
<td>7.618&quot; (193.5mm)</td>
<td>7.748&quot; (196.8mm)</td>
<td>8.433&quot; (214.2±0.3mm)</td>
<td>7.138&quot; (181.3mm)</td>
<td>4.217&quot; (107.1mm)</td>
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</table>
## TYPICAL DIMENSIONS

### Horizontal Tail & Narrow Frame

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Screen Size in Inches</th>
<th>Dim A</th>
<th>Dim B Viewable Area</th>
<th>Dim C Active Area</th>
<th>Dim D Active Area</th>
<th>Dim E Viewable Area</th>
<th>Dim F</th>
<th>Dim G Center of Active Area (Horizontal)</th>
<th>Dim H Center of Active Area (Vertical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTAS00-5.7AS-4A</td>
<td>5.7</td>
<td>5.157&quot; (131.0±0.3mm)</td>
<td>4.764&quot; (121.0mm)</td>
<td>4.535&quot; (115.2mm)</td>
<td>3.402&quot; (86.4mm)</td>
<td>3.606&quot; (91.6mm)</td>
<td>3.976&quot; (101.0±0.3mm)</td>
<td>2.648&quot; (67.25mm)</td>
<td>1.988&quot; (50.5mm)</td>
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<tr>
<td>FTAS00-6.5AS-4A</td>
<td>6.5</td>
<td>5.906&quot; (150.0±0.3mm)</td>
<td>5.433&quot; (138.0mm)</td>
<td>5.197&quot; (132.0mm)</td>
<td>3.898&quot; (99.0mm)</td>
<td>4.134&quot; (105.0mm)</td>
<td>4.567&quot; (116.0±0.3mm)</td>
<td>3.031&quot; (77.0mm)</td>
<td>2.284&quot; (58.0mm)</td>
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<tr>
<td>FTAS00-8.4AS-4A</td>
<td>8.4</td>
<td>7.343&quot; (186.5±0.3mm)</td>
<td>6.949&quot; (176.5mm)</td>
<td>6.728&quot; (170.9mm)</td>
<td>5.102&quot; (129.6mm)</td>
<td>5.331&quot; (135.4mm)</td>
<td>5.685&quot; (144.4±0.3mm)</td>
<td>3.734&quot; (94.85mm)</td>
<td>2.843&quot; (72.2mm)</td>
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<tr>
<td>FTAS00-10.4AS-4A</td>
<td>10.4</td>
<td>8.882&quot; (225.6±0.3mm)</td>
<td>8.465&quot; (215.0mm)</td>
<td>8.315&quot; (211.2mm)</td>
<td>6.236&quot; (158.4mm)</td>
<td>6.394&quot; (162.4mm)</td>
<td>6.748&quot; (171.4±0.3mm)</td>
<td>4.492&quot; (114.1mm)</td>
<td>3.374&quot; (85.7mm)</td>
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<tr>
<td>FTAS00-12.1AN-4A</td>
<td>12.1</td>
<td>10.236&quot; (260.0±0.3mm)</td>
<td>9.827&quot; (249.6mm)</td>
<td>9.677&quot; (245.8mm)</td>
<td>7.256&quot; (184.3mm)</td>
<td>7.406&quot; (188.1mm)</td>
<td>7.795&quot; (198.0±0.3mm)</td>
<td>5.177&quot; (131.5mm)</td>
<td>3.850&quot; (97.8mm)</td>
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<tr>
<td>FTAS00-15AN-4A</td>
<td>15.0</td>
<td>12.669&quot; (321.8±0.3mm)</td>
<td>12.130&quot; (308.1mm)</td>
<td>11.972&quot; (304.1mm)</td>
<td>8.980&quot; (228.1mm)</td>
<td>9.138&quot; (232.1mm)</td>
<td>9.665&quot; (245.5±0.3mm)</td>
<td>6.398&quot; (162.5mm)</td>
<td>4.833&quot; (122.75mm)</td>
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<tr>
<td>FTAS00-19AN-4A</td>
<td>19.0</td>
<td>15.571&quot; (395.5±0.3mm)</td>
<td>15.039&quot; (382.0mm)</td>
<td>14.815&quot; (376.3mm)</td>
<td>11.850&quot; (301.0mm)</td>
<td>12.102&quot; (307.4mm)</td>
<td>12.638&quot; (321.0±0.3mm)</td>
<td>7.799&quot; (198.1mm)</td>
<td>6.319&quot; (160.5mm)</td>
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* Typical Dimensions for Narrow Frames

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**Pin Signal**

- 1: Y<sub>UP</sub>
- 2: Y<sub>LO</sub>
- 3: X<sub>LE</sub>
- 4: X<sub>RI</sub>

Y<sub>UP</sub>, Y<sub>LO</sub>: Bottom Electrode Terminal
X<sub>LE</sub>, X<sub>RI</sub>: Top Electrode Terminal
Series FT

4-Wire Touch Screens with FPC Tails

Controller Board for RS232C

Controller Board for USB

DISTINCTIVE CHARACTERISTICS

- Compatible with Control Board USB/RS232C
- Equipped with EPROM for Saving Setting Data
- Device Drivers are Windows 7, 8 & 10 Compatible

Controller Boards & Drivers

System Configuration for USB

System Configuration for RS232C

Available through NKK Switches

www.nkkswitches.com
4-Wire Touch Screens with FPC Tails

General Specifications

<table>
<thead>
<tr>
<th>Items</th>
<th>FTCS04C</th>
<th>FTCU04C</th>
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<tbody>
<tr>
<td>Interface</td>
<td>RS232C</td>
<td>USB 2.0 Full Speed</td>
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<td>Clock</td>
<td>16MHz</td>
<td>16MHz</td>
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<tr>
<td>Supply Voltage</td>
<td>5.0V</td>
<td>5.0V (Bus Power)</td>
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<td>Resolution</td>
<td>10bit</td>
<td>10bit</td>
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<td>Current Consumption</td>
<td>40mA maximum</td>
<td>100mA maximum</td>
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<tr>
<td>Communication Speed</td>
<td>9600 bps</td>
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<td>Communication Format</td>
<td>Data Length: 8bit</td>
<td>Parity: None</td>
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Absolute Maximum Ratings

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<tr>
<th>Items</th>
<th>Symbols</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Supply Voltage</td>
<td>V_CC</td>
<td>–0.3V</td>
<td>+5.5V</td>
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<td>Input Voltage</td>
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<td>V_CC</td>
<td>Touch Panel Input</td>
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<td>*V_RS</td>
<td>–15V</td>
<td>+15V</td>
<td>RS232C</td>
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<tr>
<td>Operating Temperature</td>
<td>T_OPR</td>
<td>–20°C</td>
<td>+70°C</td>
<td>158°F</td>
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<td>Storage Temperature</td>
<td>T_STG</td>
<td>–25°C</td>
<td>+85°C</td>
<td>+185°F</td>
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*V_RS: Applies Only to RS232C

Recommended Values

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<th>Typical</th>
<th>Maximum</th>
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<td>Supply Voltage</td>
<td>V_CC</td>
<td>+4.75V</td>
<td>+5.0</td>
<td>+5.25V</td>
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<tr>
<td>Operating Temperature</td>
<td>T_OPR</td>
<td>–20°C</td>
<td>–4°F</td>
<td>+70°C</td>
<td>158°F</td>
</tr>
</tbody>
</table>

DISTINCTIVE CHARACTERISTICS

- Interface: USB and RS232C
- High Speed and Accuracy
- Built-in Calibration Function
- Data Function Removal Built In to Eliminate Noise

The IC is for use with the 4-wire transparent touch screens. When the screen is touched, it recognizes the position of the touch by the level of analog voltage detected by the A/D. The A/D converter receives the value and sends a set of coordinate values as serial data or USB.

IC Chip & Accessories

General Specifications for IC FTCSU548

<table>
<thead>
<tr>
<th>Items</th>
<th>LQFP 48 Pins</th>
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<tbody>
<tr>
<td>Package</td>
<td>LQFP 48 Pins</td>
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<tr>
<td>Interface</td>
<td>Serial Interface (Asynchronous) or USB (Full Speed 2.0)</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>3.3/5.0V Typ; USB Available for 5V Only</td>
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<tr>
<td>* Rated Output Current</td>
<td>High Level: –170mA Low Level: +170mA</td>
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<tr>
<td>Operation Frequency</td>
<td>16MHz</td>
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<tr>
<td>A/D Converter Resolution</td>
<td>10bit</td>
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<tr>
<td>Operating Temperature</td>
<td>–20°C ~ +85°C (~-4°F ~ +185°F)</td>
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<tr>
<td>Storage Temperature</td>
<td>–40°C ~ +125°C (~-40°F ~ +257°F)</td>
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</table>
* Total Output Electric Current Amount of all the I/O Port

Contact NKK Switches for the IC data sheet.

OPTIONAL ACCESSORIES

Receptacle Connector & Wire Assembly for RS232C

AT713 is the Receptacle Connector with code to connect to RS232C communication of the controller boards. It is compatible with FTCS04C. The cable length is adjustable.

Receptacle Connector & Wire Assembly for Power Supply

AT714 is a Receptacle Connector with code to connect to FTCS04C power source of the control boards. The cable length is adjustable.
Handling of Controller Board

- Use arc prevention to protect device from static electricity.
- Power source should be activated after host and touch panel are connected.
- When inserting connector CN1 and touch panel tail, be sure the slider of connector CN1 is pulled. Do not pull more than 10 times.
- Do not alter the product.
- Do not use any commands other than the ones outlined in the specifications.
- Place the product away from noise source (such as inverter from LCD operation) since tail can be affected by noise.
- If device driver (USB) does not work after installation, reboot the host computer while connected to the controller board.
- This product does not support suspended mode (USB).
- Protocol of USB transmission is one frame per one transaction.
- Contact factory if not using the protocol above.
- Warranty for one year after delivery. NKK warranties the 4-wire touch panel when it is used with the NKK control board and driver. Do not use third party control boards. NKK is not responsible for results of using damaged equipment with the controller boards.
- NKK Switches cannot assume responsibility for damages caused by software side during use of the touch screens.
- The touch screen pressed position may shift depending on various factors such as age, improper tail insertion or extreme temperatures. In such cases, recalibration is necessary.

Installation

- Products are ESD sensitive and ESD protection is required.
- Do not pull on the tail. Do not apply stress to the tail area.
- Avoid vibration or shock. Avoid any force or stress that may cause deformation to the product.
- The touch screen mounting should not be loose. This may cause an adverse effect on detecting performance during operation.
- Ensure there are no burrs around the edges of the case or housing that can cause false actuation. The edges of the case or housing should not enter the keying area.
- The case or housing and upper electrode should have a space of about 0.5mm to accommodate expansion or shrinkage due to temperature variances. If a shock barrier is used, do not press hard on the upper electrode area. Any shock barrier should be installed more than 0.6mm away from A.
- To secure the touch screen, secure the lower portion with a device such as the LCD display panel. Do not attach the upper electrode with double-sided tape or similar product to avoid stress that can damage the upper or lower electrode.
- In order to balance upper and lower pressure, an air vent may be installed. Ensure that no liquid or oil will enter into the device.
- Avoid air pressure applied to the touch screen as it may cause the top electrode to force air through the air vent, affecting electric endurance. If pressure inside of the touch panel is reduced through the air vent, it may cause interference fringes or may remain in ON status.
- Ensure that the glass is handled carefully to prevent breakage during installation.
- Moisture from condensation on tail connection or edges may result in migration, causing short circuit failure.
- Remove protective film from the touch screen after installation is completed.
Handling Precautions

• When opening product, take precaution with up/down and front/back directions. Glass edges are not chamfered, and corners or edges can be sharp. Wear gloves when handling the product.
• Do not pick up the product by the tail or pull the tail area.
• Use gloves or finger cots to prevent fingerprints on surface.
• When handling the product, hold it outside of the viewing area.
• Avoid stacking multiple products or placing other items on the product.
• When packing or storing, the glass should be positioned face up.

Operating Precautions

• Operate with fingers or a touch screen stylus only.
• Do not press hard with a pen or similar object between viewing area and key area.

Design Precautions

• With analog type, resistive value change (by aging or individual differences) can dislocate the input area. Input area can be calibrated with software.
• When installing on top of an LCD, noise from the display device can create misoperation. To avoid noise, implement grounding the display device frame.
• Do not create software for simultaneous touch points, as analog type will read the center point between two touch points.
• When used to draw a line, analog type will have a break at dot spacer. Compensate for this with software.
• Contact resistance may cause chatter depending on pressing condition. Software should detect signal after it stabilizes.

Other Precautions

• Clean with a soft cloth and ethanol. Do not use any cleaning agents other than ethanol.
• Store product in original package and store at the temperature and humidity range specified.
• Do not store in an environment with acids or other corrosive gases or where condensation may occur.
• Products are guaranteed based on evaluation of standards within the moisture tolerance and usage temperature range, but not guaranteed to operate perpetually at this temperature.
• Note that an incorrect type of connector may damage the print surface.
• Calibration data from one touch panel should not be applied to another panel; each should be calibrated individually.
• Recalibration is necessary if connector has been removed from the tail and reconnected.
• All specifications based on the tested touch screens only. Evaluate the products after installation with customer’s equipment.
• NKK Switches reserves the right to make product improvement changes without notice.