**TYPE : KTP150AGAC-C00**

< Touch panel >

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**Prototype**

**Issued**  
Date: Jul 10, 2009  
Kagoshima Hayato LCD Division

KYOCERA CORPORATION  
KAGOSHIMA HAYATO PLANT  
LCD DIVISION

This specification is subject to change without notice.  
Consult Kyocera before ordering.

<table>
<thead>
<tr>
<th>Original Issue Date</th>
<th>Designed by: Engineering dept.</th>
<th>Confirmed by: QA dept.</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 24, 2009</td>
<td>S. Otake, W. Yano, M. Fujitani</td>
<td>J. Sakaguchi, K. Ito</td>
</tr>
</tbody>
</table>
Warning

1. This Kyocera touch panel has been specifically designed for use only in electronic devices and industrial machines in the area of audio control, office automation, industrial control, home appliances, etc. The module should not be used in applications where the highest level of safety and reliability are required and module failure or malfunction of such module results in physical harm or loss of life, as well as enormous damage or loss. Such fields of applications include, without limitation, medical, aerospace, communications infrastructure, atomic energy control. Kyocera expressly disclaims any and all liability resulting in any way to the use of the touch panel in such applications.

2. Customer agrees to indemnify, defend and hold Kyocera harmless from and against any and all actions, claims, damages, liabilities, awards, costs, and expenses, including legal expenses, resulting from or arising out of Customer's use, or sale for use, or Kyocera touch panels in applications.

Caution

1. Kyocera shall have the right, which Customer hereby acknowledges, to immediately scrap or destroy tooling for Kyocera touch panels for which no Purchase Orders have been received from the Customer in a two-year period.
<table>
<thead>
<tr>
<th>Rev.No.</th>
<th>Date</th>
<th>Page</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Jul. 10, 2009</td>
<td>1</td>
<td>3-1. Mechanical specifications of touch panel&lt;br&gt;~Change “Outline dimensions”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>12. Outline drawing&lt;br&gt;~Change drawing&lt;br&gt;“121A5099700” → “121A5099700-1”</td>
</tr>
</tbody>
</table>
1. Application

This document defines the specification of KTP150AGAC-C00. (RoHS Compliant)

2. Construction and outline

Touch panel : Analog type (Glass/Glass)
Surface film : Glare Anti-fingerprint treatment

3. Mechanical specifications

3-1. Mechanical specifications of touch panel

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outline dimensions</td>
<td>319.5 (W) × 243.5 (H) × 2.14 (D)</td>
<td>mm</td>
</tr>
<tr>
<td>Active area</td>
<td>305.9 (W) × 229.7 (H)</td>
<td>mm</td>
</tr>
<tr>
<td>Viewing area</td>
<td>307.9 (W) × 231.7 (H)</td>
<td>mm</td>
</tr>
<tr>
<td>Mass</td>
<td>TBD</td>
<td>g</td>
</tr>
<tr>
<td>Input</td>
<td>Radius-0.8 stylus or Finger</td>
<td>-</td>
</tr>
<tr>
<td>Actuation Force</td>
<td>0.1 ~ 2.0</td>
<td>N</td>
</tr>
<tr>
<td>Operating life</td>
<td>Striking (Finger-input) 2) 1 million hits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sliding (Stylus-input) 3) 100 thousand characters</td>
<td></td>
</tr>
<tr>
<td>Transmittance</td>
<td>Typ. 80 (at full wavelength)</td>
<td>%</td>
</tr>
<tr>
<td>Reflectance</td>
<td>Typ. 15 (550nm)</td>
<td>%</td>
</tr>
<tr>
<td>Surface hardness</td>
<td>2H or more (Pencil hardness)</td>
<td>-</td>
</tr>
</tbody>
</table>

1) Please refer to outline drawing for details.
2) Striking test condition
   Testing rod : Silicon rubber (Hardness: 60°), Tip : R = 4.0
   Testing location : In active area
   Input voltage : DC 5V
   Load : 2.94N
   Cycle : 5 hits/sec
   Judgment : No defect in function
   * No appearance defect which causes trouble to use.
   * Dents, blurs and marks on surface film : neglected
3) Sliding test condition
   Testing rod : Polyacetal resin, Tip : R = 0.8
   Testing location : In active area
   Input voltage : DC 5V
   Load : 2.45N
   Input length : 10mm
   Input speed : 50 mm/sec
   Sliding times : 10mm sliding (back and forth) counts as 2 times.
   Judgment : No defect in function
   * No appearance defect which causes trouble to use.
   * Dents, blurs and marks on surface film : neglected
4. Absolute maximum ratings

4-1. Electrical absolute maximum ratings

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage for touch panel</td>
<td>$V_{TP}$</td>
<td>0</td>
<td>6.0</td>
<td>V</td>
</tr>
<tr>
<td>Input current of touch panel</td>
<td>$I_{TP}$</td>
<td>0</td>
<td>0.5</td>
<td>V</td>
</tr>
</tbody>
</table>

4-2. Environmental absolute maximum ratings

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>$T_{OP}$</td>
<td>-30</td>
<td>85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>$T_{STO}$</td>
<td>-40</td>
<td>95</td>
<td>°C</td>
</tr>
<tr>
<td>Operating humidity</td>
<td>1) $H_{OP}$</td>
<td>10</td>
<td>2)</td>
<td>%RH</td>
</tr>
<tr>
<td>Storage humidity</td>
<td>1) $H_{STO}$</td>
<td>10</td>
<td>2)</td>
<td>%RH</td>
</tr>
<tr>
<td>Vibration</td>
<td>-</td>
<td>3)</td>
<td>3)</td>
<td>-</td>
</tr>
<tr>
<td>Shock</td>
<td>-</td>
<td>4)</td>
<td>4)</td>
<td>-</td>
</tr>
</tbody>
</table>

1) Non-condensing.

2) Temp. ≤ 40°C, 85%RH Max.
   Temp. > 40°C, Absolute humidity shall be less than 85%RH at 40°C.

3) The touch panel is installed on the LCD using two sided tape.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>10 ~ 55 Hz</th>
<th>Acceleration value (0.3 ~ 9 m/s²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration width</td>
<td>0.15mm</td>
<td></td>
</tr>
<tr>
<td>Interval</td>
<td>10 ~ 55 ~ 10 Hz</td>
<td>1 minute</td>
</tr>
</tbody>
</table>

2 hours in each direction X, Y, Z (6 hours total)
EIAJ ED-2531

4) The touch panel is installed on the LCD using two sided tape.
   Acceleration: 490 m/s², Pulse width: 11 ms
   3 times in each direction: ±X, ±Y, ±Z
   EIAJ ED-2531
## 5. Electrical characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage for touch panel</td>
<td>V$_{TP}$</td>
<td>-</td>
<td>-</td>
<td>5.0</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Terminal resistance 1)</td>
<td>xL-xR</td>
<td>-</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Ω</td>
</tr>
<tr>
<td></td>
<td>yU-yL</td>
<td>-</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Ω</td>
</tr>
<tr>
<td>Linearity 2)</td>
<td>-</td>
<td>-</td>
<td>less than (±2.5)</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance 3)</td>
<td>-</td>
<td>DC25V</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>MΩ</td>
</tr>
<tr>
<td>Chattering 4)</td>
<td>-</td>
<td>at ON/OFF</td>
<td>Less than 10</td>
<td>ms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Resistance between terminal xL and xR, or between yU and yL

2) Apply 5VDC to the terminal xL-xR, and measure the output voltage at terminal y when a random input is applied in the active area. Measure the difference between the output and theoretical voltages. (Measure the actual voltage at the terminal using the same method.)

![Diagram of supply voltage and output voltage relationship]

3) Resistance between the upper and lower terminals.

4) Apply 5VDC to the terminal xL-xR, and measure the oscillation at terminal y when applying a random input in the active area. (Measure the oscillation at terminal x using the same method.)

![Diagram of chattering measurement]
6. Interface signals

<table>
<thead>
<tr>
<th>No.</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>xR</td>
<td>x-Right terminal</td>
</tr>
<tr>
<td>2</td>
<td>yL</td>
<td>y-Lower terminal</td>
</tr>
<tr>
<td>3</td>
<td>xL</td>
<td>x-Left terminal</td>
</tr>
<tr>
<td>4</td>
<td>yU</td>
<td>y-Upper terminal</td>
</tr>
</tbody>
</table>

- Touch panel side connector: 1mm pitch
- Recommended matching connector: Series 9616 (IRISO), Series 9610 (IRISO), Series FMS (JST)

7. Design guidance for analog touch panel

7-1 Electrical (In customer’s design, please remember the following considerations.)
1) Do not use the current regulated circuit.
2) Keep the current limit with top and bottom layer. (Please refer to “Electrical absolute maximum ratings” for details.)
3) Analog touch panel can not sense two points touching separately.
4) A contact resistance is appeared at the touch point between top and bottom layer. After this resistance has stable read of the touch panel position data.
5) Because noise of inverter or peripheral circuits may interfere signal of touch panel itself it is necessary to design carefully in advance to avoid these noise problem.

7-2 Software
1) Do the "User Calibration".
2) "User Calibration" may be needed with long term using. Include "User Calibration" menu in your software.
3) When drawing a line with a stylus, there may be a slight discontinuity when the stylus passes over a spacer-dot. If necessary, please provide a compensation feature within your software.

7-3 Mounting on display and housing bezel
1) Do not use an adhesive tape to bond it on the front of touch panel and hang it to the housing bezel.
2) This touch panel has an airtight but not watertight structure. Please not to use it for the applications requiring watertight or under the environments occurred condensation. If it is expected to be exposed to the environments that vapor, moisture or other liquids may seep inside a bezel, please be sure to take some measurements for drip-proof or waterproof by using sealing materials on the bezel.
8. Lot number identification

The lot number shall be indicated on the FPC tale.

KTP150AGAC-C00 - Lot number identification

\[ \downarrow \quad \downarrow \]
1 2

No1. – No2. above indicate
1. Lot No. 9 digits
2. Serial 3 digits

9. Warranty

9-1. Incoming inspection

Please inspect the touch panel within one month after your receipt.

9-2. Production warranty

Kyocera warrants its touch panel’s for a period of 12 months from the ship date. Kyocera shall, by mutual agreement, replace or re-work defective touch panel’s that are shown to be Kyocera’s responsibility.
10. Precautions for use

10-1. Usage

1) **DO NOT** store in a high humidity environment for extended periods. Surface film degradation bubbles, and/or peeling off of the surface film may result.

2) Do not push or rub the touch panel's surface with hard to sharp objects such as knives, or the touch panel may be scratched.

3) When the touch panel is dirty, gently wipe the surface with a soft cloth, sometimes moistened by mild detergent or alcohol. If a hazardous chemical is dropped on the touch panel by mistake, wipe it off right away to prevent human contact.

4) Touch panel edges are sharp. Handle the touch panel with enough care to prevent cuts.

5) Always keep the touch panel free from condensation during testing. Condensation may permanently spot or stain the surface film.

6) Do not pull the touch panel FPC and do not bend the root of the wires. Housing should be designed to protect touch panel FPC from external stress.

7) This Kyocera touch panel has been specifically designed for use in general electronic devices, but not for use in a special environment such as usage in an active gas. Hence, when the touch panel is supposed to be used in a special environment, evaluate the touch panel thoroughly beforehand and do not expose the touch panel to chemicals such as an active gas.

8) The touch panel is made of glass. It may break when dropped, hit, or vibrated excessively. Please handle with care.

10-2. Installation of the touch panel

1) The touch panel shall be installed flat, without twisting or bending.

2) Please design the housing window so that its edges are between the active area and the effective area of the touch screen. Must maintain a gap between inside of bezel and touch panel to avoid malfunction or electrode damage of touch panel.

3) A transparent protection sheet is attached to the touch panel. Please remove the protection film slowly before use, paying attention to static electricity.

4) Do not scratch, or put any stress outside the active area of the touch panel when you install it onto an LCD, or it may damage the ITO pattern of the touch panel.

10-3. Operation

1) The touch panel shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.

2) Do not use the touch panel in environments conducive to the formation of condensation.

10-4. Storage

1) The touch panel shall be stored within the temperature and humidity limits specified. Store in a dark area, and protect the touch panel from direct sunlight or fluorescent light.

2) Always store the touch panel so that it is free from external pressure onto it. This will prevent the formation of Newton rings.
# 11. Reliability test data

<table>
<thead>
<tr>
<th>Test item</th>
<th>Test condition</th>
<th>Test time</th>
<th>Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>High temp. atmosphere</td>
<td>(95)°C</td>
<td>240h</td>
<td>Touch panel function: No defect Touch panel quality: No defect Current consumption: No defect</td>
</tr>
<tr>
<td>Low temp. atmosphere</td>
<td>(−40)°C</td>
<td>240h</td>
<td>Touch panel function: No defect Touch panel quality: No defect Current consumption: No defect</td>
</tr>
<tr>
<td>High temp. humidity</td>
<td>(40)°C (90)% RH</td>
<td>240h</td>
<td>Touch panel function: No defect Touch panel quality: No defect Current consumption: No defect</td>
</tr>
<tr>
<td>Temp. cycle</td>
<td>(-40)°C 0.5h R.T. 0.5h (95)°C 0.5h</td>
<td>10cycles</td>
<td>Touch panel function: No defect Touch panel quality: No defect Current consumption: No defect</td>
</tr>
<tr>
<td>High temp. operation</td>
<td>(85)°C</td>
<td>500h</td>
<td>Touch panel function: No defect Touch panel quality: No defect Current consumption: No defect</td>
</tr>
<tr>
<td>Point activation</td>
<td>Silicon rubber R4, Hardness 60°</td>
<td>one million times</td>
<td>Touch panel function: No defect Terminal resistance: No defect Insulation resistance: No defect Linearity: No defect Actuation Force: No defect No appearance defect which affects touch panel function. 2)</td>
</tr>
<tr>
<td>Sliding</td>
<td>Polyacetal resin, Tip : R = 0.8</td>
<td>one million times</td>
<td>Touch panel function: No defect Terminal resistance: No defect Insulation resistance: No defect Linearity: No defect Actuation Force: No defect No appearance defect which affects touch panel function. 2)</td>
</tr>
</tbody>
</table>

1) Test in active area.
2) Dents, blurs and marks on surface film: neglected.
3) 10mm sliding (back and forth) counts as 2 times.
4) Each test item uses a test touch panel only once. The tested touch panel is not used in any other tests.
5) The touch panel is tested in circumstances in which there is no condensation.
6) Temp. cycle test (Heat shock included): the LC shall be tested after leaving it stabilize at room temperature for 2 hours after the last cycle.
7) An operational test was performed after the following conditions. First, the touch panel was left for a certain time under 5V voltages applied (without touch), Then it was left at room temperature (No VDC applied) for 2 hours.
8) The reliability test is not an out-going inspection.
9) The result of the reliability test is for your reference purpose only. The reliability test is conducted only to examine the touch panel's capability.