

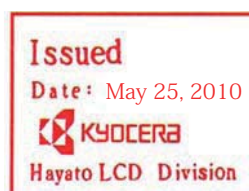
SPEC

| | |
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| Spec No. | TQ3C-8EA00-E1BYK05-00 |
| Date | May 22, 2010 |

TYPE : KTP084AGAB-D00
< Touch panel >

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KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

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

| Original Issue Date | Designed by: Engineering dept. | | | Confirmed by: QA dept. | |
|---------------------|--------------------------------|--------------------|--------------------|------------------------|-----------------|
| | Prepared | Checked | Approved | Checked | Approved |
| May 22, 2010 | Y IKEDA | <i>Y. Yamazaki</i> | <i>M. Fujitani</i> | <i>J. Sakaguchi</i> | <i>Lo. Itoh</i> |

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.

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Revision record

| Date | | Designed by : Engineering dept. | | | Confirmed by : QA dept. | |
|---------|------|---------------------------------|--------------|----------|-------------------------|----------|
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| Rev.No. | Date | Page | Descriptions | | | |
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1. Application

This document defines the specification of KTP084AGAB-D00. (RoHS Compliant)

2. Construction and outline

Touch panel : Analog type(Glass/Glass)
 Surface film : Anti-glare Anti-finger print treatment

3. Mechanical specifications

3-1. Mechanical specifications of touch panel

| Item | Specification | Unit |
|-----------------------|-----------------------------|------------|
| Outline dimensions 1) | 185.3(W)×140(H)×1.44(D) | mm |
| Active area | 171.5(W)×128.8(H) | mm |
| Viewing area | 173.5(W)×130.8(H) | mm |
| Mass | TBD | g |
| Input | Radius-0.8 stylus or Finger | - |
| Actuation Force | TBD | N |
| Operating life | Striking(Finger-input) 2) | hits |
| | Sliding(Stylus-input) 3) | characters |
| Transmittance | Typ.80(at full wavelength) | % |
| Reflectance | Typ.15(550nm) | % |
| Surface hardness | 3H or more(Pencil hardness) | - |

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 : DC5V
 Load : 2.94N
 Cycle : 5hits/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 : DC5V
 Load : 2.45N
 Input length : 10mm
 Input speed : 50mm/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

| Item | Symbol | Min. | Max. | Unit |
|--------------------------------|-----------------|------|------|------|
| Supply voltage for touch panel | V _{TP} | 0 | 6.0 | V |
| Input current of touch panel | I _{TP} | 0 | 0.5 | mA |

4-2. Environmental absolute maximum ratings

| Item | Symbol | Min. | Max. | Unit |
|-----------------------|------------------|------|------|------|
| Operating temperature | T _{OP} | -30 | 85 | °C |
| Storage temperature | T _{STO} | -40 | 95 | °C |
| Operating humidity 1) | H _{OP} | 10 | 2) | %RH |
| Storage humidity 1) | H _{STO} | 10 | 2) | %RH |
| Vibration | - | 3) | 3) | - |
| Shock | - | 4) | 4) | - |

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.

| | | |
|-----------------|-------------|---|
| Frequency | 10~55 Hz | Acceleration value (0.3~9 m/s ²) |
| Vibration width | 0.15mm | |
| Interval | 10-55-10 Hz | 1 minutes |

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

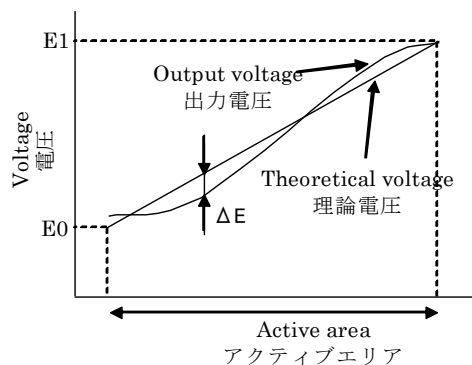
3 times in each direction: ±X, ±Y, ±Z

EIAJ ED-2531

5. Electrical characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|--------------------------------|----------|-----------|---------------------|------|--------|------------|
| Supply voltage for touch panel | V_{TP} | - | - | 5.0 | - | V |
| Terminal resistance | xL-xR | - | (200) | - | (1000) | Ω |
| | yU-yL | - | (150) | - | (950) | Ω |
| Linearity | 2) | - | less than ± 2.5 | | | % |
| Insulation resistance | 3) | DC25V | 50 | - | - | M Ω |
| Chattering | 4) | at ON/OFF | less than 10 | | | ms |

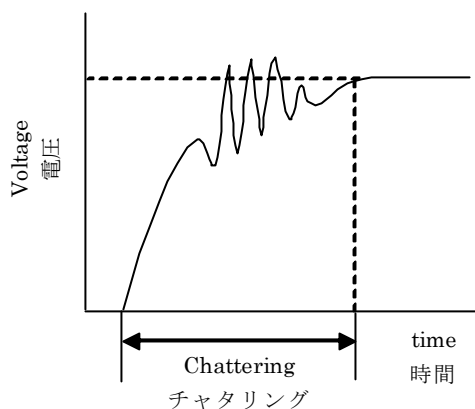
- 1) Resistance between terminal xL and xR, or between yU and yL.
- 2) Apply 5VDC to the terminal xL-xR, and measure the output voltage at terminal y when a random input is applied in the active area. Measure the difference between the output and theoretical voltages. (Measure the actual voltage at the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



$$\text{Linearity (\%)} = \frac{E_{\text{max}}}{E1 \cdot E0}$$

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- 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.)



8. Lot number identification

The lot number shall be indicated on the FPC tale.

KTP084AGAB-D00 - □□□□□□□□ □□□

↓ ↓
 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 on to an LCD, or it may damage the ITO pattern of the touch panel.
- 5) The touch panel is made of glass. It may break when dropped, or vibrated excessively. Usually there is a film on the surface of the glass which would prevent broken glass from scattering, but nevertheless handle it carefully during assembly and treat it gently during use.

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.

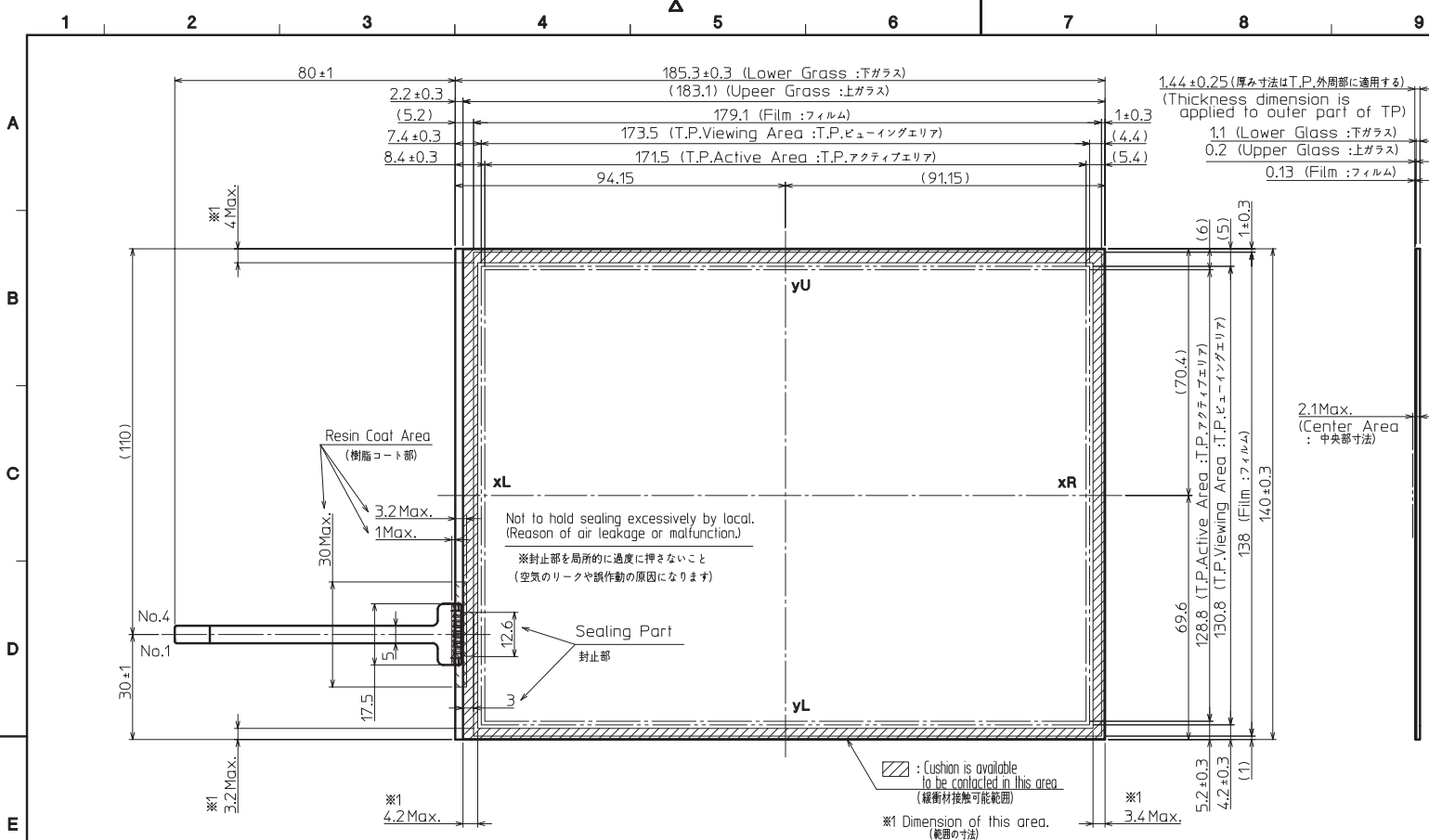
10-4. Storage

- 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.

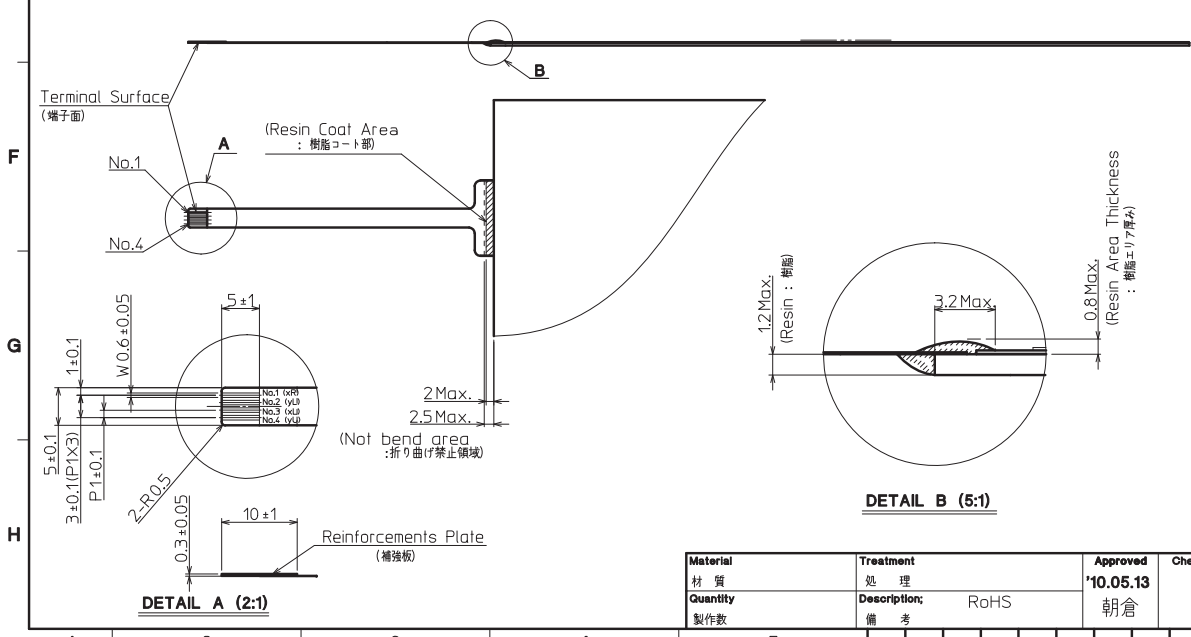
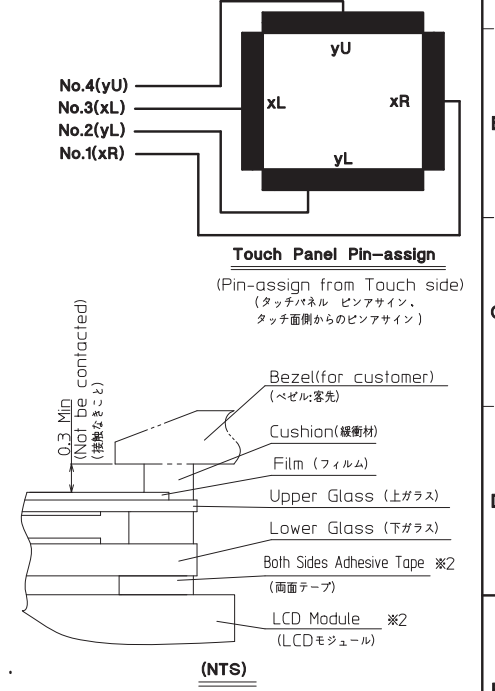
11. Reliability test data

| Test item | Test condition | Test time | Judgement |
|--------------------------------|--------------------------------------|-----------|--|
| High temp. atmosphere | 95°C | 240h | Touch panel function : No defect Terminal resistance : No defect Linearity : No defect Actuation Force : No defect |
| Low temp. atmosphere | -40°C | 240h | Touch panel function : No defect Terminal resistance : No defect Linearity : No defect Actuation Force : No defect |
| High temp. humidity atmosphere | 40°C90% RH | 240h | Touch panel function : No defect Terminal resistance : No defect Linearity : No defect Actuation Force : No defect |
| Temp. cycle | -40°C 0.5h R.T. 0.5h 95°C 0.5h | 10cycles | Touch panel function : No defect Terminal resistance : No defect Linearity : No defect Actuation Force : No defect |
| High temp. operation | 85°C | 500h | Touch panel function : No defect Terminal resistance : No defect Linearity : No defect Actuation Force : No defect |
| Point activation 1) | TBD | TBD | Touch panel function : No defect Terminal resistance : No defect Linearity : No defect Actuation Force : No defect No appearance defect which affects touch panel function. 2) |
| Sliding 1) | TBD | TBD 3) | Touch panel function : No defect Terminal resistance : No defect Linearity : No defect Actuation Force : No defect No appearance defect which affects touch panel function. 2) |

- 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) The reliability test is not an out-going inspection.
- 7) 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.
- 8) Temp. cycle test (Heat shock included): the LCD shall be tested after leaving it stabilize at room temperature for 2 hours after the last cycle.
- 9) 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.



| No | Description | Drawn | Checked | Checked | Approved |
|----|-------------|-------|---------|---------|----------|
| | | | | | |
| | | | | | |
| | | | | | |



Note. (注記)

| No | Name (名称) | Explanation (説明) |
|----|------------------------------------|--|
| 1 | T.P. | Touch panel (タッチパネル) |
| 2 | T.P. Active Area (T.P. アクティブエリア) | Operating area of touch panel (タッチパネルの動作範囲) |
| 3 | T.P. Viewing Area (T.P. ビューイングエリア) | Warranty area of touch panel's appearance (タッチパネルの外観(傷・異物等)保証範囲) |

By giving pressure between the active area and the viewing area of the touch panel, there is a possibility that the touch panel will operate.
(タッチパネルアクティブエリアとタッチパネルビューイングエリア間は荷重をかけた場合は、タッチパネルが動作する可能性があります。)

Precaution in use of touch panel.
(タッチパネル使用上の注意事項)

※2 In case of assemble to the LCD (LCDに取り付ける場合)

1. Fix touch panel at LCD module and the rear side of touch panel.
(タッチパネルの固定はLCDモジュール側とタッチパネル裏面とで行なうこと)
2. Must maintain a gap between inside of bezel and touch panel to avoid malfunction or electrode damage of touch panel.
(ベゼル内側とタッチパネルの接触厳禁、誤動作や電極破損の原因となります。)
3. Tolerance without indication: ±0.5 (指示無き公差)

| | | | | | | | | | |
|-----------------|-------------------|-----------------------|---------|----------------------|-------------------------|-------------------------------|----------------------------|-----------------------------|-----------|
| Material 材質 | Treatment 処理 | Approved '10.05.13 | Checked | Checked '10.05.13 | Drawn 木口 | Scale 1:1 (5:1,2:1,NTS) | Title KTP084GAB | Year-Month-Day '10.05.10 | Size 2 |
| Quantity 製作数 | Description 備考 | 朝倉 | 鶴崎 | 木口 | T.P. Outline Dimensions | | Drawing No. 121A8026500 | 1 | 1 |

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| Spec No. | TQ3C-8EA00-E2BYK05-00 |
| Date | May 22, 2010 |

KYOCERA INSPECTION STANDARD

TYPE : KTP084AGAB-D00

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

| Original Issue Date | Designed by : Engineering dept. | | | Confirmed by : QA dept. | |
|---------------------|---------------------------------|--------------------|-------------|-------------------------|----------------|
| | Prepared | Checked | Approved | Checked | Approved |
| May 22, 2010 | Y IKEDA | <i>Y. Yamazaki</i> | M. Fujitani | J. Sakaguchi | <i>Ho. Ish</i> |

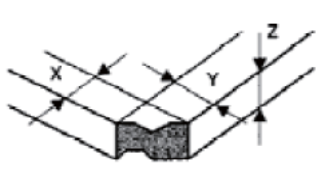
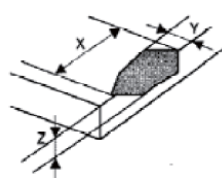
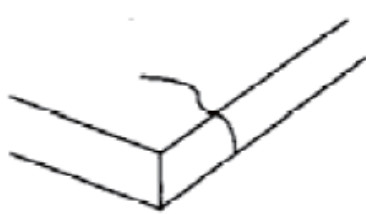
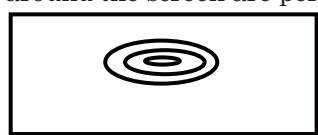

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Visuals specification

1) Note

| | Note | |
|-------------------------------|--|--|
| General | <ol style="list-style-type: none"> 1. Customer identified anomalies not defined within this inspection standard shall be reviewed by Kyocera, and an additional standard shall be determined by mutual consent. 2. This inspection standard about the image quality shall be applied to any defect within the active area and shall not be applicable to outside of the area. 3. Inspection conditions <ul style="list-style-type: none"> Luminance : 500 Lux min. Inspection distance : 300 mm. Temperature : 25 ± 5°C Direction : Directly above | |
| Definition of inspection item | Touch Panel (Scratch , Foreign particle) | Describes scratches on the glass and film and foreign particles between glass/glass or glass/film. |

2) Standard

| Inspection item | Judgement standard | | | | |
|---|---|---|-------------|-------------------------|-----------------|
| Scratch, Foreign particle (Touch screen portion) | (W = Width, L = Length, D = Diameter = (major axis + minor axis) / 2) | | | | |
| | Item | Width(mm) | Length(mm) | Acceptable number | |
| | Scratch | $W \leq 0.03$ | $L \leq 20$ | Neglected | |
| | | $0.03 < W \leq 0.05$ | $L \leq 10$ | 2pcs within ϕ 20mm | |
| | | $0.05 < W \leq 0.08$ | $L \leq 6$ | 2pcs within ϕ 20mm | |
| | | $0.08 < W \leq 0.1$ | $L \leq 4$ | 1pcs within ϕ 30mm | |
| | Foreign (line like) | $W \leq 0.05$ | Neglected | Neglected | |
| | | $0.05 < W \leq 0.1$ | $L \leq 5$ | 2pcs within ϕ 30mm | |
| | Foreign (circle like) | $D \leq 0.2$ | | Neglected | |
| | | $0.2 < D \leq 0.3$ | | 2pcs within ϕ 30mm | |
| Above are applied to the visible area. Unless there are foreign particle and damage affected seriously to the electrical performance out of the active area, we approve of this product. | | | | | |
| Glass crack (Touch screen portion) | Item | Size (mm) | | Acceptable number | |
| | Conner crack |  | X | ≤ 3 | 2 pcs /panel |
| | | | Y | ≤ 3 | |
| | | | Z | $< t$ | |
| | Crack in other area than in corner |  | X | ≤ 5 | 2 pcs /side |
| | | | Y | ≤ 1.5 | |
| | | | Z | $< t$ | |
| Progressive crack |  | | | 0 pcs (NG even 1pcs) | |
| Above are applied to the visible area. Unless there are foreign particle and damage affected seriously to the electrical performance out of the active area, we approve of this product. | | | | | |
| Newton's ring | All Newton Rings in the center of the screen must be rejected. Border around the screen are permitted. | | | | |
| |  |  | | | |
| | NG | OK | | | |