

GUNZE ELECTRONICS USA CORPORATION

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SPECIFICATIONS FOR ANALOG TOUCH PANEL

GUNZE MODEL NO. G-34-1D

1. Range of Application

These specifications are applied to GUNZE Product No. G-34-1D.

2. Shape

Shape, structure and dimension are referred to the proper Drawing No. G-34-F-01.

3. Rating

3.1 Maximum voltage and current

DC5V less than 1mA at contact point of top layer with bottom layer

3.2 Operation temperature

From -10C to +60C (humidity: from 20% to 50%, no dew condensation)

3.3 Storage temperature

From -20C to +70C (humidity: from 20% to 90%, no dew condensation)

4. Electrical

4.1 Terminal resistance unit of measurement

Between XL and XR: 283.9 ~ 483.9 Ω

Between YU and YL: 287.0 ~ 387.0 Ω

4.2 Linearity

X axis: +/- 1.0%

Y axis: +/- 1.0%

*Measurement as per attached Appendix 1.

4.3 Insulation resistance

10M Ω or more at DC25V

4.4 Chattering

30msec or less

5. Mechanical performance

5.1 Input: R-0.8 stylus or finger

5.2 Actuation force

10g ~ 80g

*Measurement as per attached Appendix 2.

5.3 Transparency

Typical: 79%

5.4 Surface hardness

Pencil hardness 3H or more according to JIS-K5400.

6. Reliability

6.1 Exposure to high temperature

TTP is put into a vessel at the condition of 80C for 120 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 4.1
- *Linearity: According to Section 4.2
- *Insulation resistance: According to Section 4.3
- *Chattering: According to Section 4.4

6.2 Exposure to low temperature

TTP is put into a vessel at the condition of -20C for 120 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 4.1
- *Linearity: According to Section 4.2
- *Insulation resistance: According to Section 4.3
- *Chattering: According to Section 4.4

6.3 Exposure to constant temperature and humidity

TTP is put into a vessel at the condition of 60C, 90% RH for 120 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 4.1
- *Linearity: According to Section 4.2
- *Insulation resistance: According to Section 4.3
- *Chattering: According to Section 4.4

6.4 Repetition of high and low temperatures

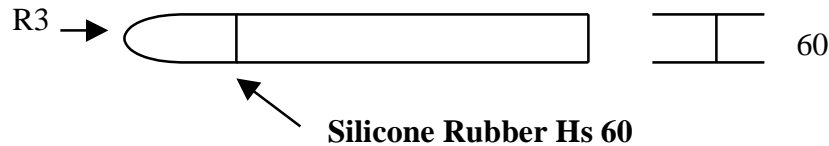
TTP is put into a vessel at the condition of -20C for 30 minutes and then 80C for 30 minutes. This process is repeated by 10 cycles. Then it is left at room temperature for 24 hours or more. The measurement must satisfy the following:

- *Resistance between terminals: According to Section 4.1
- *Linearity: According to Section 4.2
- *Insulation resistance: According to Section 4.3
- *Chattering: According to Section 4.4

7. Durability

7.1 Finger touches

TTP is hit one million time with a silicone rubber of R3, hardness of 60.
(Hitting force: 250g, at 2 times a second)



The measurement must satisfy the following:

- *Resistance between terminals: According to Section 4.1
- *Linearity: According to Section 4.2
- *Insulation resistance: According to Section 4.3
- *Chattering: According to Section 4.4

7.2 Writing friction

After the slide writing test (Refer to Appendix 3), the measurement must satisfy the following:

- *Resistance between terminals: According to Section 4.1
- *Linearity: According to Section 4.2
- *Insulation resistance: According to Section 4.3
- *Chattering: According to Section 4.4

8. Inspection

8.1 Resistance between terminals

Criterion: According to Section 4.1.

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

8.2 Linearity

Criterion: According to Section 4.2.

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

8.3 Insulation resistance

Criterion: According to Section 4.3.

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

8.4 Appearance

Criterion: According to the visual criterion.

All TTPs are inspected.

TTP COSMETIC INSPECTION CRITERIA

The following are applied to the viewing area only. They are ignored in the non-viewing areas as long as the electrical performance of the TTP is functional. W= Width L= Length D= Diameter GT= Glass thickness. **Contamination** that can be cleaned using a soft cloth with ethyl alcohol does not apply to these inspection criteria. If the object is 3 times longer in one direction than in a perpendicular direction, then it is considered a linear foreign object. Extra dielectric dots are treated as a granular foreign object. Extra silver or carbon is regarded as a defect.

Granular foreign object

CRITERIA	DECISION
$D < 0.3\text{mm}$	ignored
$0.3\text{mm} \leq D \leq 0.5\text{mm}$	In cases where the object is $>20\text{mm}$ in distance from any other scratch or foreign object, it is ignored. In cases where the object is $<20\text{mm}$ in distance from any other scratch or foreign object, the TTP is regarded as a defect.
$D > 0.5\text{mm}$	TTP is defective.

Linear foreign object

CRITERIA	DECISION
$W < .04\text{mm}$	In cases of $L \leq 4\text{mm}$ the object is ignored
$.04\text{mm} \leq W \leq .09\text{mm}$	In cases of $L \leq 4\text{mm}$ where the object is $>20\text{mm}$ in distance from any other scratch or foreign object, it is ignored. In cases of $L \leq 4\text{mm}$ where the object is $< 20\text{mm}$ in distance from any other scratch or foreign object, TTP is defective. In cases of $L > 4\text{mm}$ the TTP is regarded as a defect.
$W > .09\text{mm}$	The TTP is regarded as a defect

Scratch

CRITERIA	DECISION
$W \leq .04\text{mm}$	In cases of $L \leq 20\text{mm}$ the scratch is ignored
$.04\text{mm} \leq W \leq .06\text{mm}$	In cases of $L \leq 20\text{mm}$ where the scratch is $>20\text{mm}$ in distance from any other scratch or foreign object, it is ignored. In cases of $L \leq 20\text{mm}$ where the scratch is $<20\text{mm}$ in distance from any other scratch or foreign object, the TTP is defective. In cases of $L > 20\text{mm}$ the TTP is regarded as a defect.
$W > .06\text{mm}$	The TTP is regarded as a defect

Corner Fragment		$x \leq 3.0\text{mm}$ and $y \leq 3.0\text{mm}$ and $z \leq \text{GT}$ it is ignored GT = Glass Thickness
Side Fragment		$x \leq 6.0\text{mm}$ and $y \leq 2.0\text{mm}$ and $z \leq \text{GT}$ it is ignored GT = Glass Thickness
Progressive		TTP is regarded as defect

10. Indication of Products Lot

10.1 Date Code

4 digit number and alphabet is used for date code.
Date code label is attached on flexible tail.

10.2 Indication

1-st digit	Shows year (If produced in 1994, "3" is shown)			
2-nd digit	Shows month			
1: JANUARY	4: APRIL	7: JULY	X: OCTOBER	
2: FEBRUARY	5: MAY	8: AUGUST	Y: NOVEMBER	
3: MARCH	6: JUNE	9: SEPTEMBER	Z: DECEMBER	
3-rd & 4-th digit Shows the date				

11. Handling Remarks

Storage Store touch panels in boxes under storage temperature.

Unpack Open the box after checking the up/down indicator.

Handling Use gloves and masks when handling touch panels.

Hold touch panels at outside of view area and do not touch where tails are heat-sealed in order to avoid disconnection.

Please do not pile touch panels onto other touch panels. The edge of the touch panel causes scratches on the surface of the other touch panels.

Do not put heavy objects on touch panels.

Assembly After protective film is released, and when protective film is laminated to TTP again, please check to see that there is no dirt on it.

Please design housing which minimizes stress onto touch panels.

Please pay attention not to harm touch panels with your tools which may be used to assemble. (Plastic tools are recommended).

Please pay the best attention not to create any stress to the heat-sealed tails. Heavy stress may cause disconnection.

Touch panels have slender holes to make inner pressure and outer pressure even. Please design housing not to store any water or lubricants near this hole.

Design Guidance for Analog Touch Panel (T/P)

---This is very important information. Read carefully, please!---

Electrical

Gunze analog touch panel: “High-Clear Panel” can produced in many shapes and sizes. And we also can prepare touch panel controller chips: “AHL-Series” (soon to be CRS series). It is well designed to ensure the best performance with our T/P, so we strongly recommend the use of this I/C. Or, in the customer’s design, please take into account the following considerations:

1. DO NOT use the current regulated circuit.
2. Keep the current limit with top and bottom layer (See Sec 3.1)
3. Analog T/P cannot sense two points touching separately or simultaneously
4. A contact resistance appears at the touch point between the top and bottom layer. After the resistance stabilizes, then read the T/P position data.
5. Analog T/P also acts as a “Capacitor” in an equivalent circuit. Design your sensing circuit and low-pass filters considering this “Capacitor” value.

Software

1. Do the “User Calibration” after mounting the T/P onto your LCD, ELD, or any such kind of flat display.
2. “User Calibration” may be needed with long-term using. Include “User Calibration” menu in your software programming.
(Details for “Calibration” are in our specification papers of the “Analog Touch Panel Controller”)

Mechanical Design

1. Each “Area”
Gunze Analog T/P is well-designed to fit LCDs, ELDs, and flat-panel displays. Please confirm the information before starting your design.

<1> Key Area

“Key Area” is the area where T/P specifications (Linearity, Durability, Actuation force, etc.) are guaranteed.

- 1) Do a touch data sensing and calibration inside this area.
- 2) In normal cases, it is the same size as your flat display’s “active area”.
- 3) The ITO layer durability near the edge of the Key area is less stronger than the center.
We recommend that any icons or key positions be placed away from the edge.

<2> B-Zone

“B-Zone” is the area just outside the “Key Area” and normally the width is 1.5 or 2.0mm. T/P specifications (Linearity, Durability, Actuation force, etc.) are not guaranteed. (Fig. 3)

- 1) In this area the T/P will also turn on with pressing by finger or pen. But the appeared voltage is not suitable for position data.
- 2) Design your unit to avoid the potential shorting problem from the bezel housing edge contacting the T/P surface of this area (See Fig. 1). This is commonly known as “False Touches”.
- 3) In this area, durability with pen sliding is one-tenth compared with the “Key Area” and the Actuation force is nearly double. (See Fig. 3. The value is the average of measurement, not a guaranteed one).
- 4) Normally the width of the “B-Zone” is 2.0mm at the T/P shorter side, and 1.5mm at the longer one. Sometimes it will be the opposite. Please reference that T/Ps specific drawing.

<3> Transparent Insulation-paste area (CVB)

Insulation-paste is printed with a distance of 1.0mm outside the “Key Area”.

- 1) The purpose is to avoid potential shorting problems from the bezel housing edge when integrating (“False Touches”).
- 2) Consider your housing edge position to keep 1.0mm distance from this paste line. (See Fig. 1)
- 3) The cross-section of this edge is tapered. So if it is over the display’s active area, it will be shining as a prism.

<4> Prohibited Area

Input by pen and/or finger is prohibited in this area.

Because of the thickness around the T/P, the ITO layer on the PET film will be expanded and will crack if pressed upon (See Fig. 2).

- 1) We strongly recommend that the bezel should protect this area.
- 2) Exposure of this area as well as stylus contact should be avoided.
- 3) When assembling, DO NOT press this area with tools.
- 4) Consider your design to avoid the pressure by the housing bezel.

Example of Housing Design

1. If a customer will be putting their palm on the housing during normal usage, care should be taken as follows:
 - 1) Keep the gap, for example 0.3 to 0.7mm between the bezel edge and T/P surface. The reason is to avoid the bezel edge from contacting the T/P surface that may cause a “short” with the bottom layer. (See Fig. 1)
 - 2) Insertion of a cushion material is recommended (Gasketing).
 - 3) The cushion material should be limited only on the busbar insulation paste area. If it over the paste area, a “short” may occur.

Mounting on display and housing bezel

1. In all cases, the T/P should be supported from the backside of the glass.
2. Do not use an adhesive-tape to bond it on the front of the T/P and hang it to the housing bezel.
3. Never expand the T/P top layer (PET-film) like a balloon by internal air pressure. The life of the T/P will be extremely short.
4. If dew will be on the heat-sealed area or exposed traces at the end of the flexible tail, migration of silver may occur. This will sometimes cause a short circuit. If your final product will be used under humid conditions, or will be moved from humid, warm environments to cold ones, condensation can occur. You might want to consider a water-tight seal with your housing bezel.

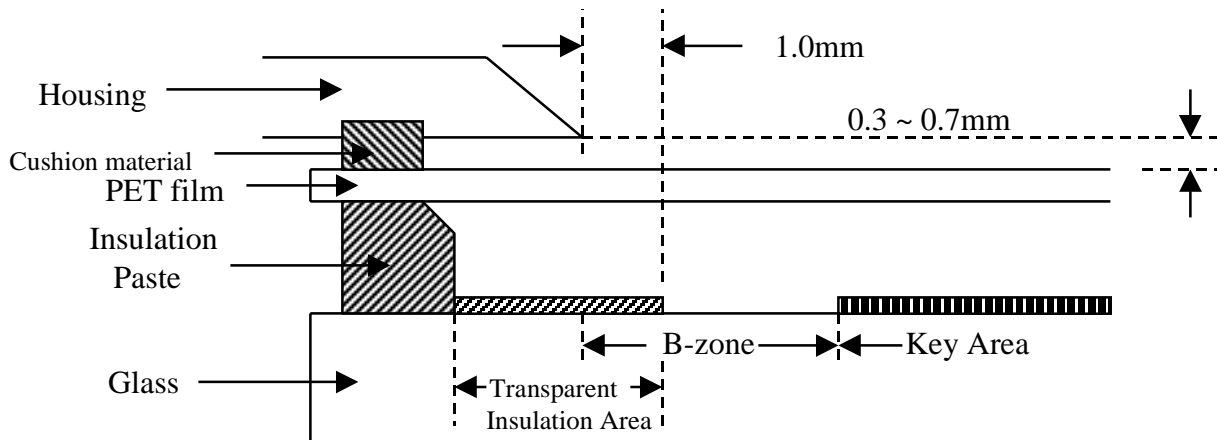


Fig.1

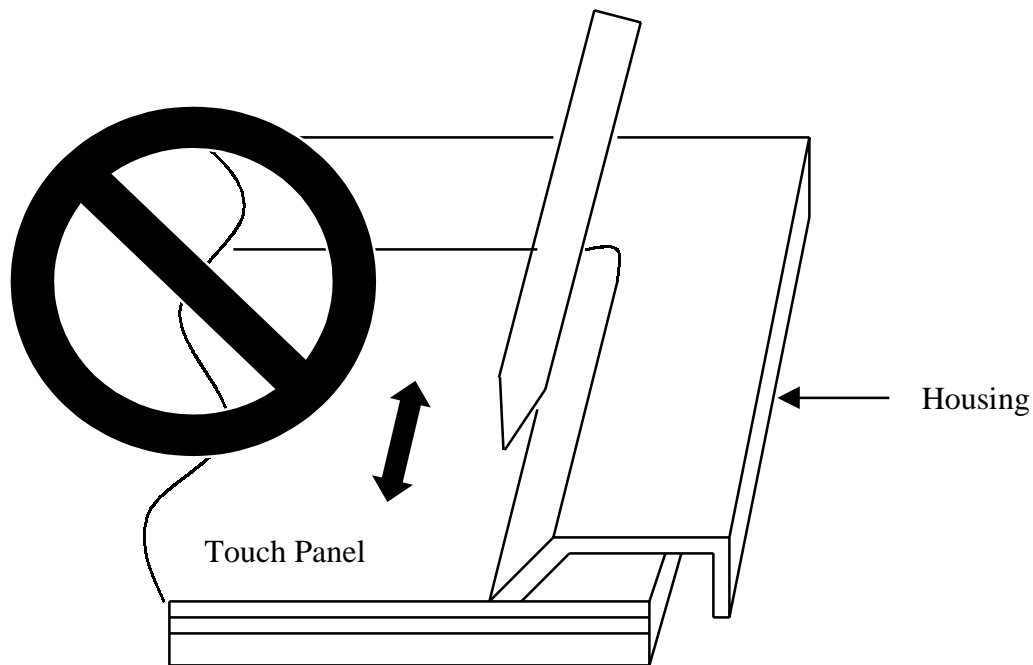
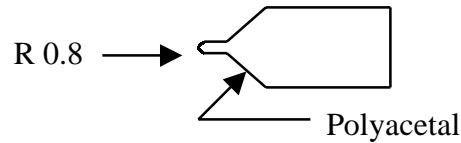


Fig. 2

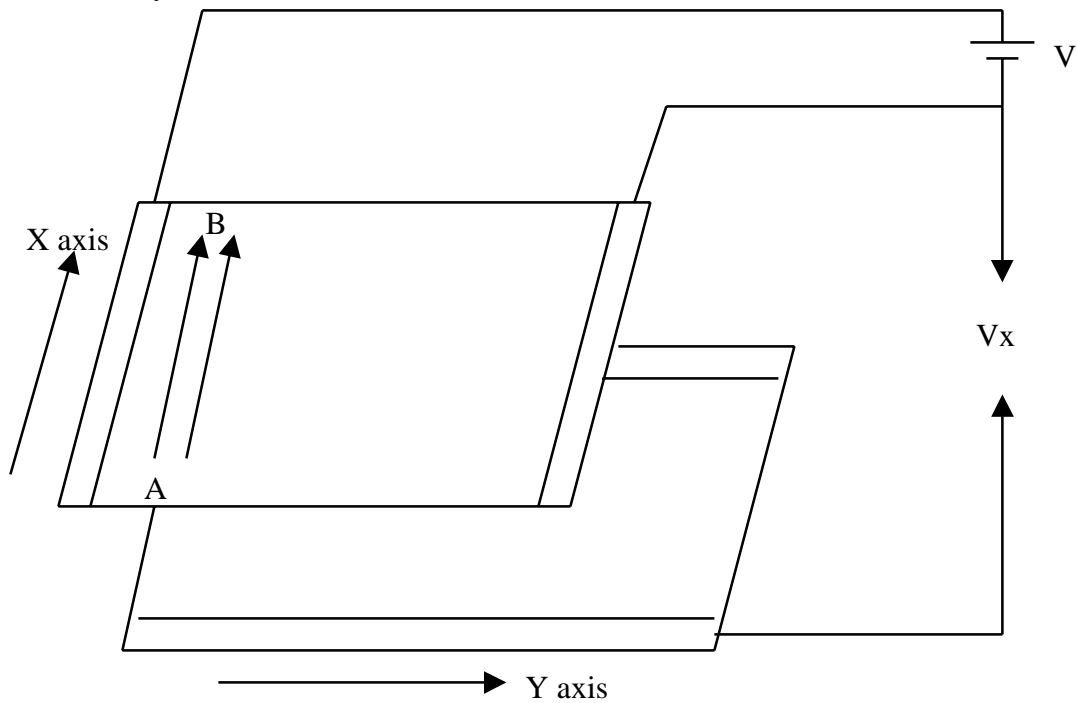
Appendix 1: Linearity

Voltage (DC 5 volt) is applied to the top electrode.
 Output Voltage $V(X)$ on the bottom electrode is measured.
 Input the touch screen continuously from A to B along X axis.
 Output Voltage $V(X)$ on the bottom electrode is measured continuously.
 Then the next line is measured.
 A polyacetal tip with 0.8 radius is used.



Linearity is measured by: $((V_{Xmax} - V_{Xmin}) / V) \times 0.5 \times 100 (\%)$
 V_{Xmax} : Maximum Value of Output Voltage $V(X)$
 V_{Xmin} : Minimum Value of Output Voltage $V(X)$

For the Y axis direction, exchange the Voltage Input direction, and measure the voltage in the same way.



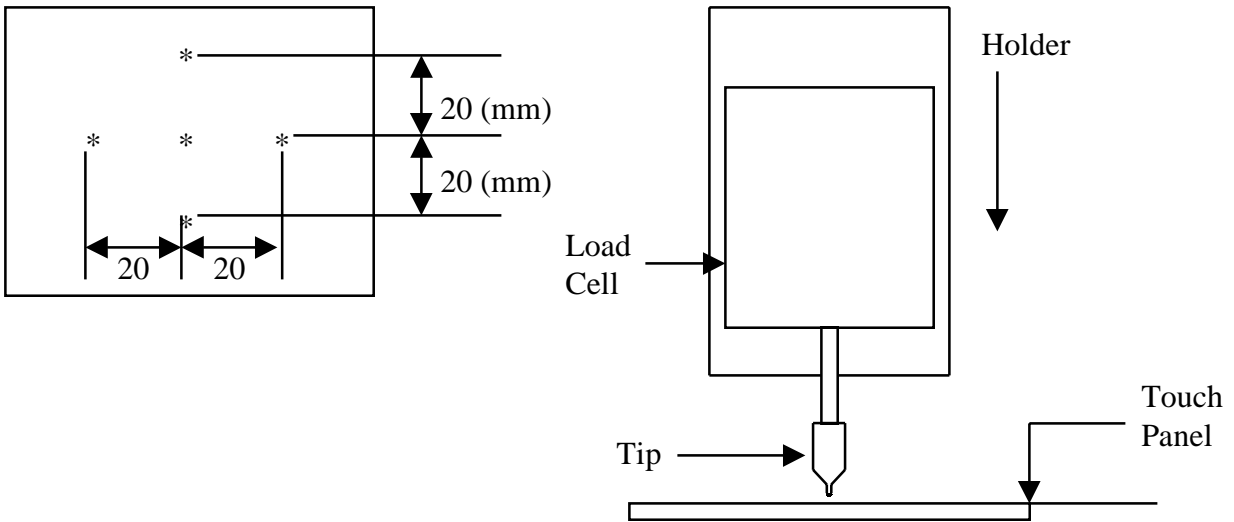
Appendix 2: Actuation force

Tip: Polyacetal Tip (R=0.8, 0.8 diameter)-----Stylus
 Silicone Rubber Tip (R=3.0, 6.0 diameter)-----Finger

Equipment: Load Cell (Shinpo kogyo)

Measurement Position: 5 points per 1 piece by about 20mm distance (See below)
 The average of 5 values is calculated.

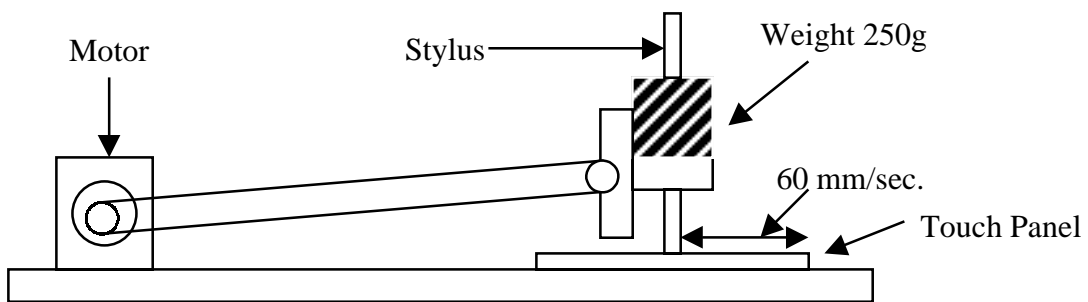
Remarks: Voltage value is stable.

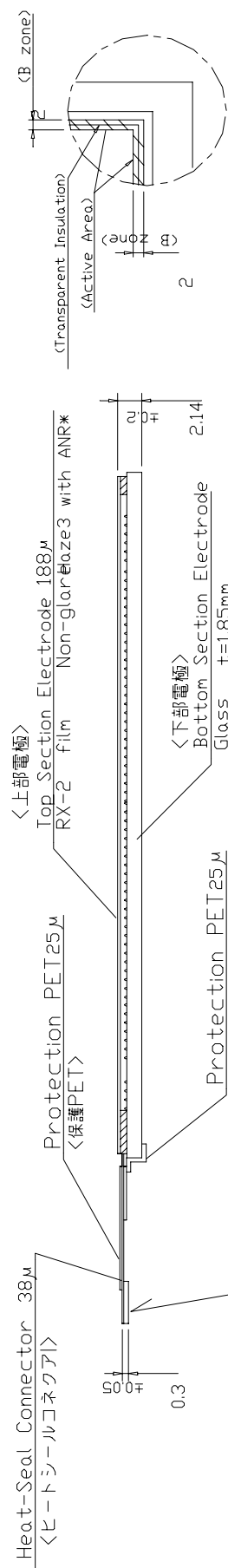
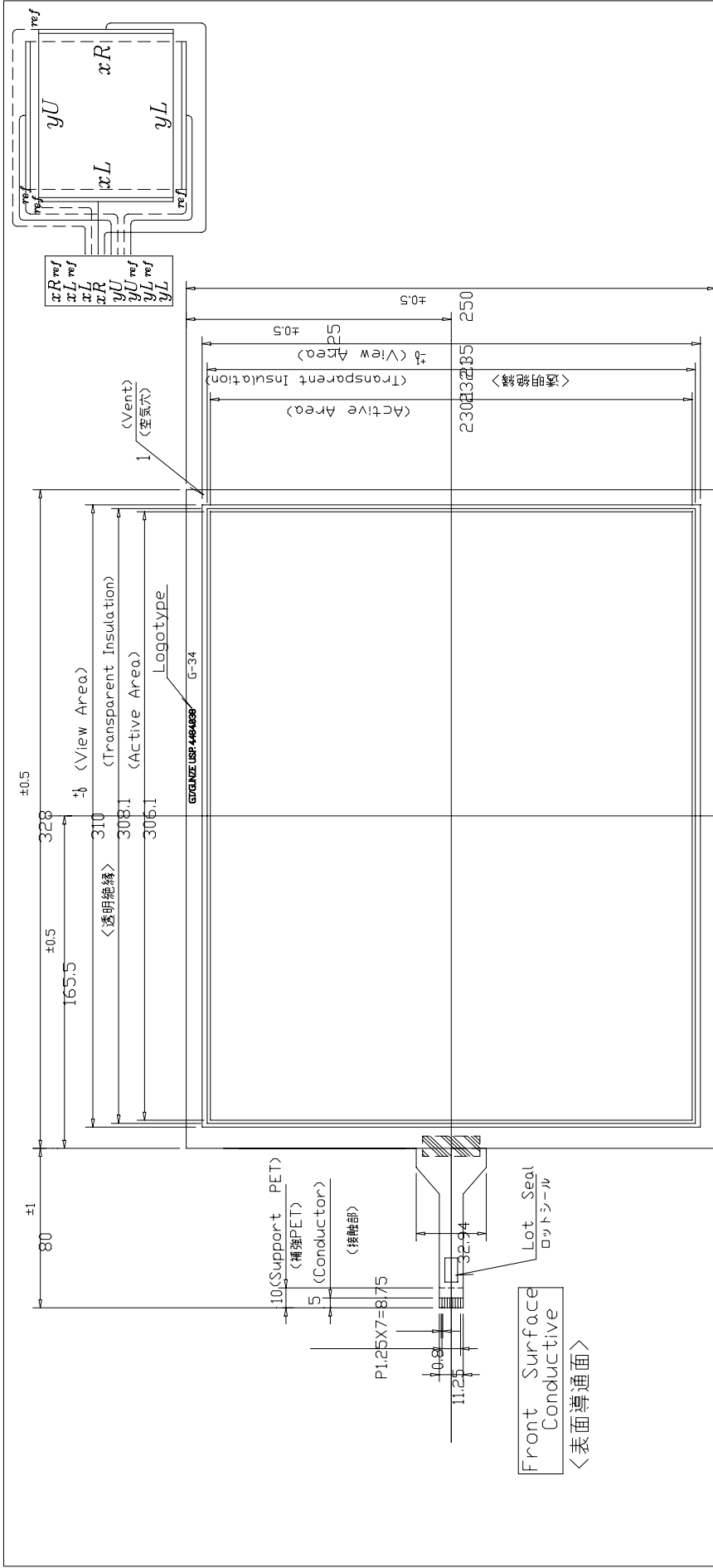


Appendix 3: Writing Friction

Stylus is moved like below under the following conditions:

Pen: 0.8R Polyacetal stylus
 Load: 250gf
 Speed: 60 mm/sec.
 Repeated: 100,000 times
 Measurement Position: Center of Panel





APPROVED :	DATE : 1998,3,6
CHECKED :	TITLE : TOUCH PANEL
DRAWN :	<イボチパネル>
DESIGNED :	MODEL : G-34-1D
SCALE : 1/2	
DRAWING No. : G-34-F-01	
GUNZE LIMITED	
ELECTRONICS MATERIAL CENTER	

ISSUE DATE	REVISIONS
3 RD ANGLE PROJECTION	
Gunze株式会社	
電子機能材料センア	

*ANR : Anti-Newton Ring treatment

Dorman Patent, (U.S.P. 4,484,038)