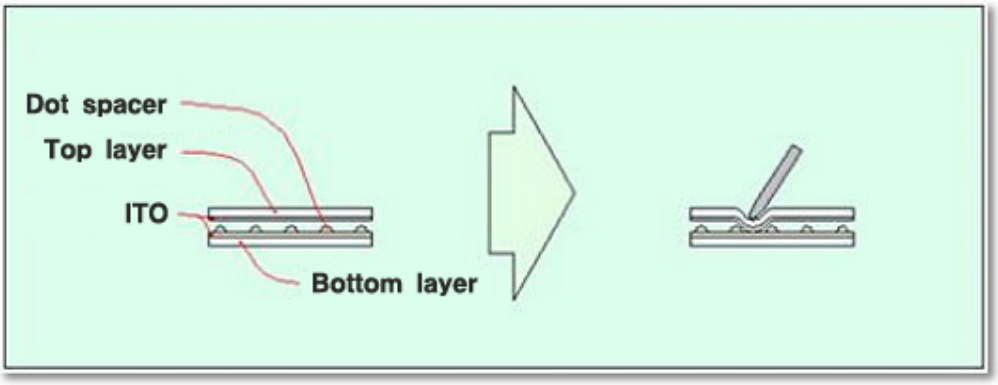
5-wire analog resistive touch panel

1 . What is the analog resistive film method?

A. The most generalized method among touch panel technologies.

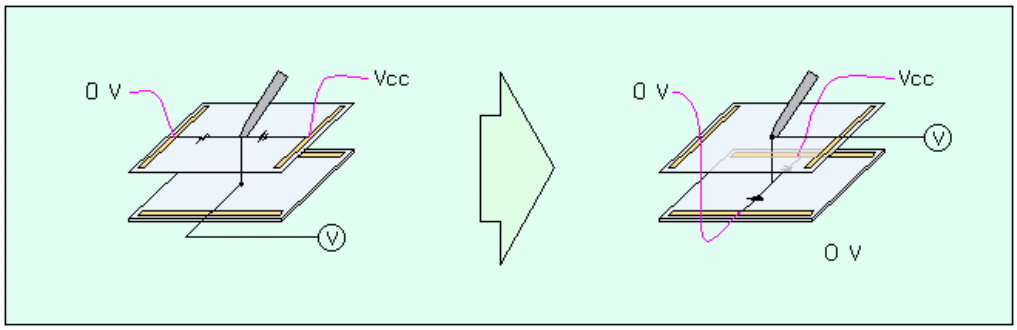
B. By use of a pair of conductive films inserted between the upper and lower layer facing each other, if pressure exceeding a certain level is applied to a random position, the two conductive films are designed to touch each other. The basic structure of a resistive touch panel is as follows.



2 . Types of analog resistive film methods

A. 4-wire analog resistive

① As the most generalized method among analog resistive films, the structure and operation mechanism of the method are as follows.

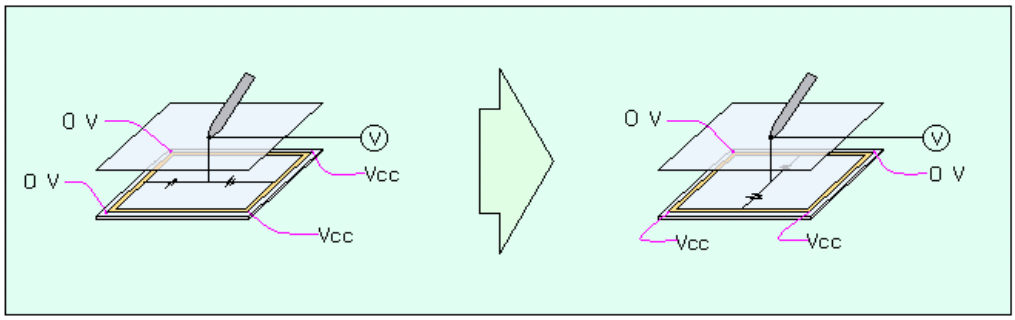


② As shown in the above drawing, voltage is applied to the electrodes located on each side of the upper film. If a random spot is pushed down while voltage is applied on the upper film, potential at the lower film is measured and the X-coordinate is detected. For the detection of the Y-coordinate, voltage is applied to the lower film, and potential at the upper

film is measured. After all, this method picks up X and Y coordinates separately.

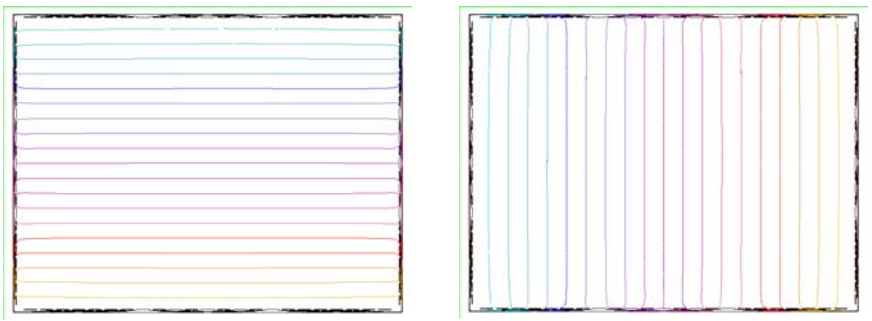
B. 5wire analog resistive

① Normally, the upper part of an analog resistive panel detects only one of X or Y-coordinates. However this method has disadvantages due to the wear of the film, damage to electrodes caused by stress, the degradation of homogeneity on the conductive film, and the drift of detected coordinates. A 5-wire resistive film is a technology to complement these shortcomings and its mechanism and operating principle are as follows.



② As shown in the above drawing, in a 5-wire resistive touch panel different, the lower part (normally glass) measures both X and Y-coordinates, while the upper part (normally film) only applies voltage. Due to this difference in basic design, a 5-wire method features outstanding stability and endurance and is not affected by damage to the electrodes on the upper part and the degradation of homogeneity of the conductive film.

③ The following is an illustration of the coordinate system in a 5-wire



system. As shown above, a 5-wire resistive film has a structure that generates both X and Y-coordinates on the lower layer, so that it can have a structural advantage of excellent endurance compared to a 4-wire system.

3 . Advantages of a 5-wire resistive touch panel

A. It is a resistive touch panel that provides outstanding endurance and reliability compared to a more widely used 4-wire touch panel.

B. In terms of touch endurance, a 4-wire panel allows one million touches, while a 5-wire one is guaranteed for 30 million times, resulting in higher reliability.

C. Different from the common resistive film method, we concentrate electrodes on the glass to enhance the touch-responding reliability.

D. Accuracy is maintained even if the film surface is damaged. With the endurance for repeated touches on the same spot exceeding 30 million times, it can be used for applications where a resistive touch panel could not be adopted previously. Response is also faster and more accurate.

E. Generally a resistive panel is formed through a drying process. But the 5-wire resistive film is produced by fusing electrodes of more than 4H directly on the glass surface to provide resistance to humidity, cold and heat. This is a very reliable production method that makes a five-year warranty a reality.

F. While a common resistive film requires frequent re-calibration due to the stress on the film side, a 5-wire film does not use coordinates on the film side and hence forms and maintains stable coordinates, so that calibration is required only about once at the initialization of the system and very effective environment for maintenance is provided.

G. Besides, in order to prevent short circuit due to the degradation of the tail, the data communication line between the panel and the controller, we furnish an FPCB of a double axis method and a tensile strength between panels higher than 2Kgf (compared to 800gf of our competitors), thereby perfectly responding to short circuit problems owing to panel failure and the degradation or corrosion of the FPCB.

4 . Comparison of the features and advantages of 5-wire analog resistive film (based on our own products)

	4-wire	5-wire
Electrode endurance	3H or less (adhesion method)	4H or up (fusion method)
Film endurance	3H or up	3H or up
Result of damaged film	Changes in coordinates	No change
Coordinate measuring method	Glass: coordinate 1/2 Film: coordinate 1/2	Glass coordinate: 2/2 Film coordinate: None
Endurance for repeated touches on the same spot	1 million times or up	30 million times or up
Calibration requirement	Occasional occurrence	About once after initialization
Tensile strength at the tail	0.8Kgf or up	2.0Kgf or up
Warranty period	One year	Five years