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# PCAP Water Resistance

## Water Resistance Criteria and Design Guideline for EXC80H/EXC82H Solution



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For 東莞市越豐光電有限公司

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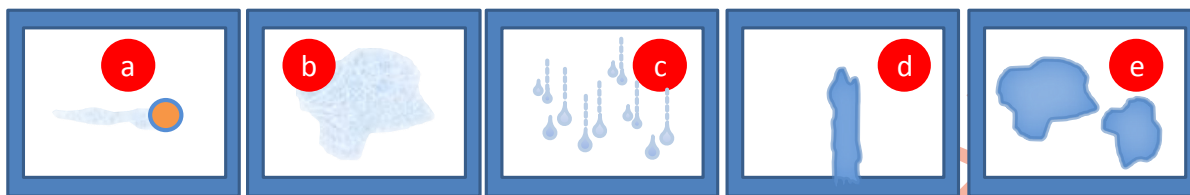
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## 1 Water and Touch Performance

Liquids or conductive materials can affect mutual capacitance signal and make touch performance unstable.

Below describes how the touch performance being affected by water for a projected capacitive (PCAP) touch system.

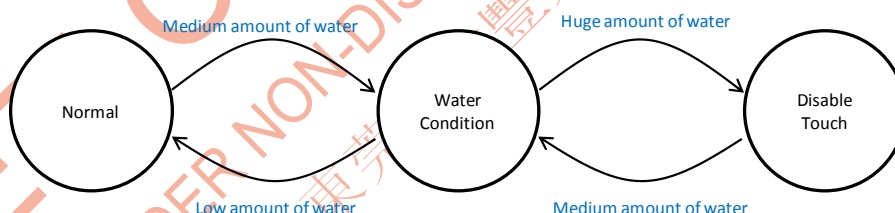


	Condition	Touch Performance
a	Wet Finger	Few jitter or not accurate influences on sensitivity and linearity.
b	Sprayed / Moisture	Some jitter or not accurate influences on sensitivity and linearity.
c	Water Drips	Running water drips might cause a false touch. There might be a false touch, break or jitter when drawing across water drips.
d	Pouring	Pouring may cause a false touch. There may be some false touches, breaks or jitters when drawing across pouring water.
e	Puddles	Puddles would cause a false touch. There may be some obvious false touches, breaks or jitters in the trace when drawing across puddles.

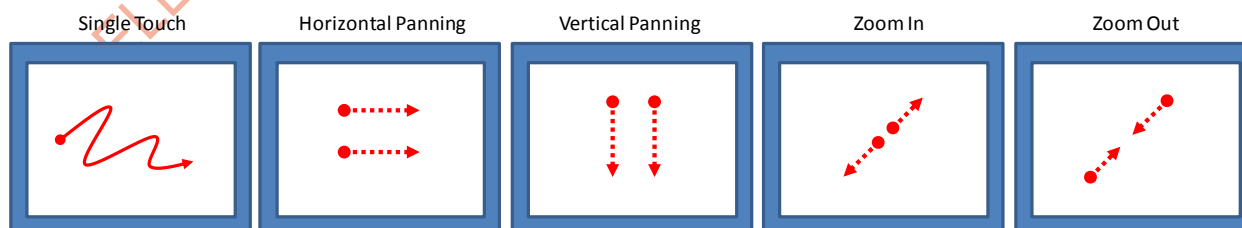
## 2 Water Resistance in EETI EXC80H/EXC82H Solution

The water resistance function in EETI EXC80H/EXC82H touch solution is designed to against water interference. Touch controller will detect the water situation on the touch panel and enable water resistance mode, or disable touch function.

Below state diagram shows the mode switch for water resistance.



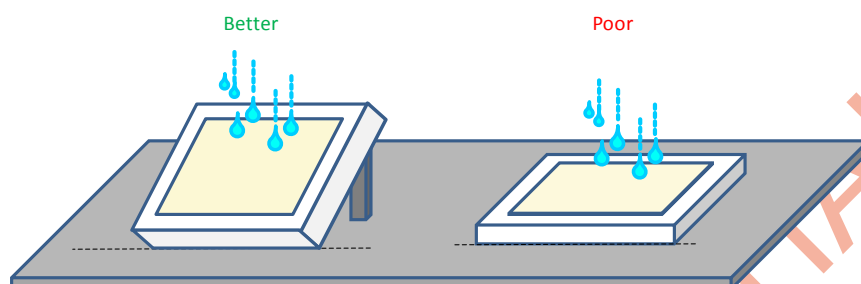
Touch function will be downgrade under water condition mode, it changes to single touch with two finger gesture to maximize the stability of touch performance under water interfering. The firmware can also be fixed in the water condition mode if required, which makes most stable touch function for water proof orientated applications.



**The water resistance performance is related to the touch sensitivity. If customer wants to apply high sensitivity for glove touch, it will cause very poor water resistance performance.**

### 3 Evaluation of the Water Resistance Performance

The followings are the water resistance criteria after applying water resistance function when simulating the water condition on the touch system tilted to proper angle (e.g., 60° degrees).



Water Resistance Performance Table

	Water behavior	Fresh Water			5% Salt Water		
		False Touch	Single Touch	Two Finger Gesture	False Touch	Single Touch	Two Finger Gesture
1	Wet finger	No False Touch	Normal	Normal	No False Touch	Normal	Normal
2	Spray/ Moisture	Low Risk	Normal	Normal	Low Risk	Low Impact	Low Impact
3	Water Drips	Low Risk	Low Impact	Low Impact	Medium Risk	Medium Impact	Medium Impact
4	Pouring	Medium Risk	Medium Impact	High Impact	High Risk	High Impact	N/A
5	Puddles	High Risk	High Impact	High Impact	High Risk	High Impact	N/A
6	Wipe out water	No False Touch*	Normal	Normal	No False Touch*	Normal	Normal

False Touch	Description
Low Risk	Rarely a false touch near the border.
Medium Risk	Occasionally a false touch near the border.
High Risk	Often a false touch near the border.
Wipe out	The contact of wiping may cause a touch. No false touches after wiping out the water.

Touch Performance	Description
Normal	No obvious performance drop.
Low Impact	Rarely broken line or jittered drawing.
Medium Impact	Occasionally broken line or jittered drawing.
High Impact	Often broken line or jittered drawing.
N/A	Very poor performance and not suitable for touch operation.

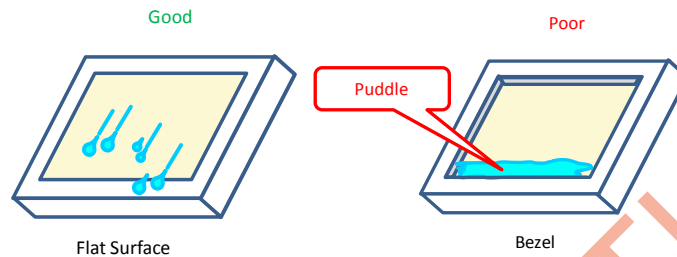
**Note:** Salt water or other liquid with high conductivity will cause serious signal interference and make touch unstable.

Besides, the water resistance performance is related to the touch sensitivity. If customers want to apply high sensitivity for glove touch, that will cause poor performance of water resistance.

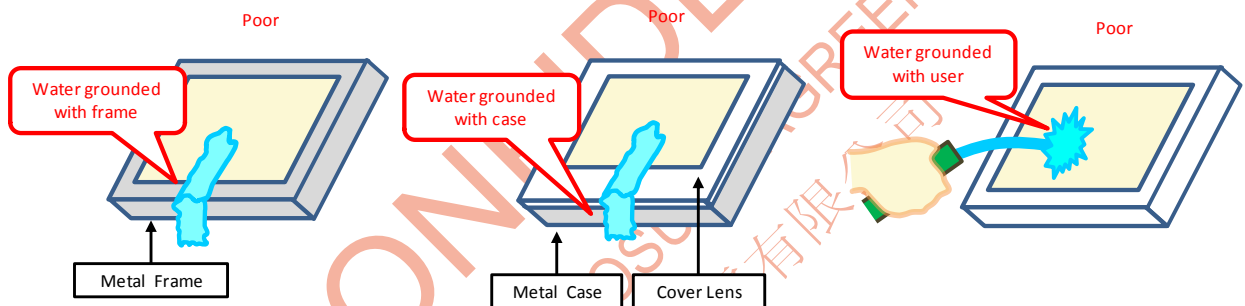
#### 4 Better System Design for Water Resistance

The followings are the better designs for good water resistance performance:

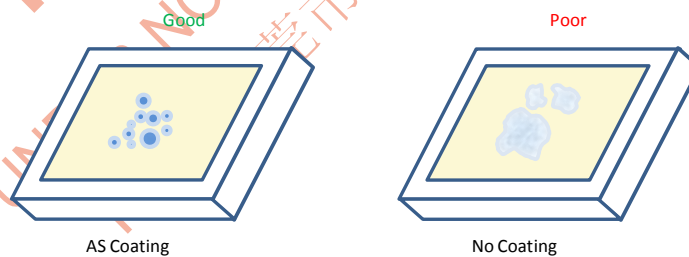
- a. System should be a flat surface design and able to drain water off easily.



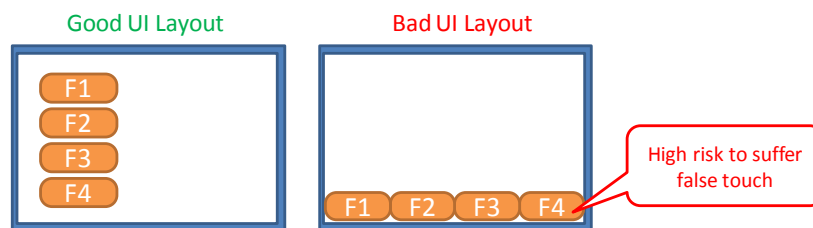
- b. The border around touch sensor should not be conductive. Water will be grounded to the system through the metal border. The water signal is similar to a real touch. If water connects users and touch panel, it is similar to a finger touch, too.



- c. Water repellent coating (AS coating) on the cover glass can make great help to decrease water contact area, which reduces the water interference signal strength.



- d. A proper UI design can help reduce the risk of abnormal operation, since the water is more easily to have false touches on the edge area. Please avoid designing UI functions around the edge area.





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