Fingerprint Enrollment & Matching Information

ZKTeco

Enrollment Threshold

During enrollment of fingerprints, ZKTeco requires you to capture multiple images of the same finger to create a consolidated fingerprint template. By providing several fingerprint samples, the fingerprint scanner software or fingerprint algorithm has more minutiae points to create better fingerprint templates.

Enrollment Threshold is to set the threshold for FP template comparison during your registration process. It makes sure that the three fingerprint (template) placements are from one of the fingerprints. 65 is most strict on the enrollment and make the enrollment harder. 35 is less strict on the enrollment and make the enrollment very easy. The optimal value for the enrollment threshold is 50.

Tip: Please ensure that when you are capturing multiple images of the same finger, the user lifts their finger and places it again on the scanner between each capture.

Matching Threshold

Every Fingerprint software has a pre-defined fingerprint matching threshold. It is highly unlikely that 2 fingerprint minutiae templates acquired from same finger at different sessions will be 100% exact match. Hence during fingerprint matching, the fingerprint software compares 2 fingerprint templates and returns a match score. If the match score is higher than the predefined match threshold then the input template is said to have successfully matched with the stored template. 65 is most strict on the matching and make the matching harder. 35 is less strict on the matching and make the matching very easy

Note: *If the match threshold is set too high, then you will have high False Rejections. If the match threshold is too low then we will have high False Acceptance. The optimal value for matching threshold is 45.*

Best practices:

1| **Mount the Reader on the wall before enrolling the users.**

2| **Train users to place the finger correctly on the fingerprint scanner**

To get the best fingerprint images, the finger should be placed directly on the finger scanning area of the fingerprint sensor. Usually the tip of the finger is at the top of the finger sensing area and the finger is centered from left to right.

For the best quality images, fingers should be placed such that a maximum area of the fingerprint is imaged. Generally, this means that the first knuckle of the finger is at the bottom of the platen and the fingertip is at the top, with the finger centered on the platen from left to right.

Getting Good Fingerprint Images

The quality of fingerprint images is relative to the number of minutiae points captured by the Time Clock's sensor. Fingerprint images not possessing an adequate number of minutiae points may be unreadable. It is advised to issue a secret password for those users whose fingerprint images lack sufficient minutia points and cannot be read by the sensor. Also, you may consider purchasing an Time Clock with an integrated card reader if you do not intend to assign passwords

Figure A-2 shows poor-quality fingerprints, characterized by smudged, faded or distorted areas on the fingerprint. These conditions can be caused by excessive dryness, wetness, insufficient pressure or scarring of the skin at the fingertip..

Dry	Wet	Scarred

The Time Clock fingerprint matching algorithm is capable of extracting the correct minutiae without the benefit of a perfect print. However, the positioning of the finger and the moisture and pressure of the fingerprint are significant factors to consider when it is placed on the sensor. This will help achieve a good consistent fingerprint match.

Correcting Wet or Dry Fingerprint Images

When the temperature is rigid or when hands have just been washed, fingerprints often become very dry. In this case, the user should moisturize his/her fingerprint simply by breathing on the fleshy pad of his/her fingertip prior to placing his/her finger on the sensor. The moisture from his/her breath should improve the recognition of his/her fingerprint.

Conversely, if the fingerprint is too wet, the ridges and valleys are rendered indistinguishable. The lack of recognizable minutiae causes wet fingerprints to be rejected by the Time Clock. This can be remedied simply by swiping the finger on a clean dry towel or cloth.

How much pressure is required for a good-quality fingerprint?

If too much pressure is applied when pressing down on the sensor, the finger's ridges become pressed together and create an unrecognizable image. Applying too much pressure (similar to fingerprints that are too wet) will create a "blurred" image which the Time Clock sensor might not recognize.

If too little pressure is applied, the resulting image will be similar to the dry fingerprint and unidentifiable. Issues related to moisture and pressure can easily be addressed with practice and users getting a feel of the sensor.

Be sure to maintain contact with the fingerprint sensor for 2 full seconds, until the Time Clock responds.
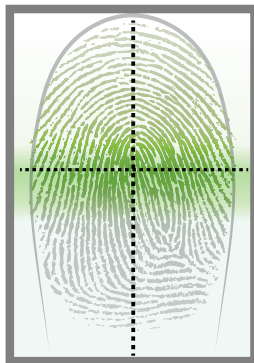
The Time Clock has both audio and visual indicators which respond when the Time Clock senses a finger.

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Proper Finger Placement

The user's finger should completely cover the sensor. The finger should be placed flat and in the center of the sensor. The finger should cover at least 80% of the sensor as shown below
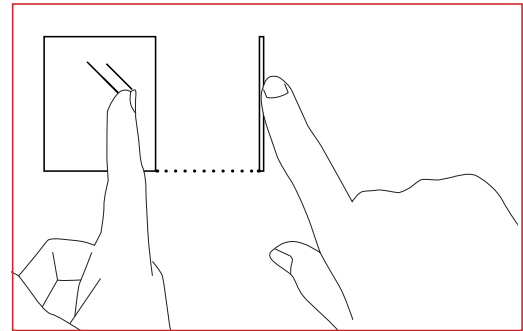
Be sure to maintain contact with the fingerprint sensor for 2 full seconds, until the Time Clock responds.
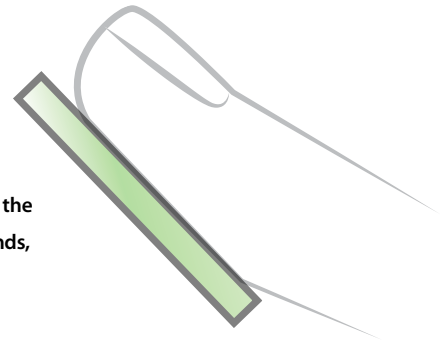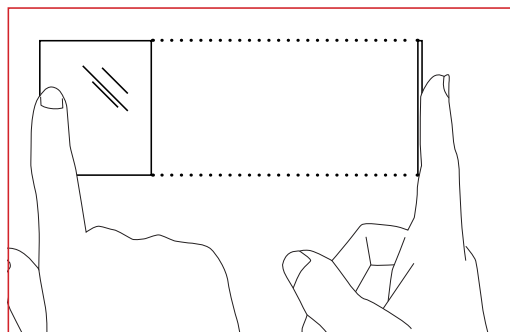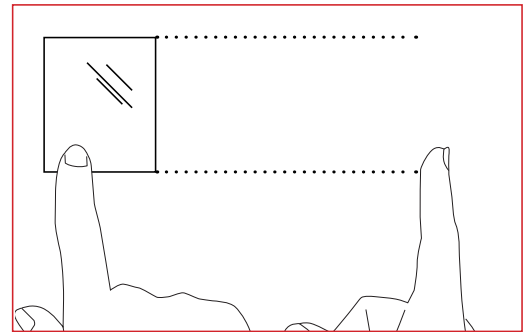
The finger should NOT be placed in the following positions:
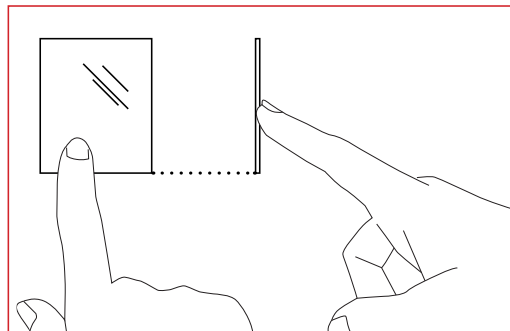
Upright

Skewed

Sideways

Partial