

## 9.4. Going the Distance

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In **\_Going the Distance\_** you are given 1 minutes to rack up as much hitting distance s as you can.

### ***Game Notes:***

- You can level up in this game to get more time!
- Every time you hit 5x your Competition Level's home run distance, you will level up.
- This will reset your clock minus ten seconds. So the first time you level up, it will reset to 0:50 seconds. Then 0:40 and so on.
- Fence distances vary by Sport and Competition Level. For information on fence distance used, select an option: [Baseball](#) or [Fast-Pitch Softball](#)

# 10. Start a Swing Session

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There are multiple ways to starting a swing session in SwingTracker.

1. Using SwingTracker as a [Player](#)
2. Using SwingTracker as a [Coach](#) and recording swings with a player in a Group
3. Using our [Disconnected](#) feature (For disconnected swing sessions, please see our **Disconnected Swings** section of the guide)

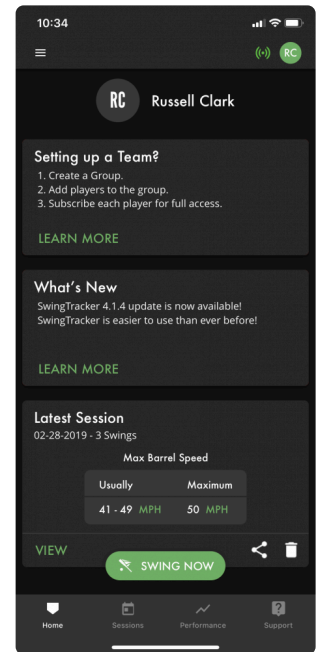


The sensor will need to register an impact in order to record data. Dry swings will not capture data.

## 10.1. Player

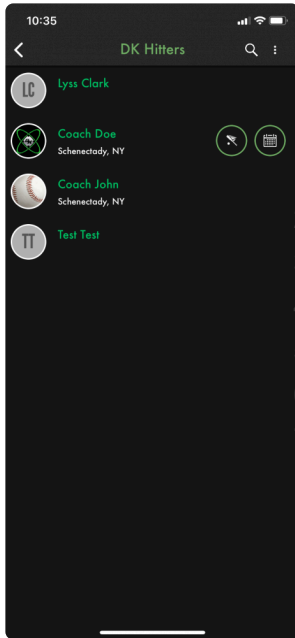
To start a swing session in the SwingTracker app follow the steps below.

1. Make sure your sensor is [on](#) and [connected via Bluetooth](#) to your device.
2. Open up your SwingTracker app and log in.
3. Select the **Swing Now** option on at the bottom of your dashboard screen.
4. Start Swinging!



The sensor will need to detect contact in order to capture metrics.

## 10.2. Through a Group



Follow the steps below to start a swing session in the SwingTracker app through the Groups feature:

1. Make sure your sensor is [on](#) and [connected via Bluetooth](#) to your device.
2. Open up your SwingTracker app and log in.
3. Navigate to your Group page
4. Select the Group that the player is in
5. Select the name of the Player that is swinging
6. To the right of their name you'll see a bat icon, select this icon
7. Start Swinging!



The sensor will need to detect contact in order to capture metrics.

# 11. Swing Session Views

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When looking at live or historical swings, there are several different views in which you can see your data: [3D View](#), [Video](#), and [Damage Potential](#)

## 11.1. 3D View

### Welcome to 3D View!

At the top of the page you'll see three (3) icons: *3D*, a *video camera* and a *baseball field*. The 3D should be highlighted white. Here you'll see the 3D rendering of your swing! In the 3D bat path, the blue area is your Distance in the Zone and the red area is your contact point.

#### Control Menu

At the bottom of the 3D screen you'll see controls. To watch the 3D, press the play button. The rounded arrows on either side of the play button will take you through the swing step by step. The eye icon on the controls will change the view at which you see the 3D. You can drag the white bar to go slow motion through your 3D.

#### Comparing Swings

To the far left of the control panel you'll see an icon that has a bat on either side of a line. This allows you to compare 3D views. Select this icon. Then select a swing from the top of the page (swings are represented by a diamond with a number). You'll see the 3D views overlap. The green swing path is the first swing you were on. The bronze is the swing path of the one you selected. If you rotate your device sideways (**Make sure rotation lock is off!!**), the 3D's will appear side by side. The controls on the control menu will work the same. To exit swing compare press the icon again, it should go from green to grey.



Comparing 3D

You can also compare the 3D rendering of a swing to a video of another swing. To indicate if a swing has video, a white video icon will appear next to that swing's diamond. To compare to video, select the compare icon. Then select a swing from the top of the page. Rotate your device sideways (**Make sure rotation lock is off!!**) and the 3D's will appear side by side. Your original swing will be on the left, the swing you are comparing it to on the right. Then tap on the side of the screen which has the video you'd like to compare to. The controls on the control menu will work the same. To exit swing compare press the icon again, it should go from green to grey.

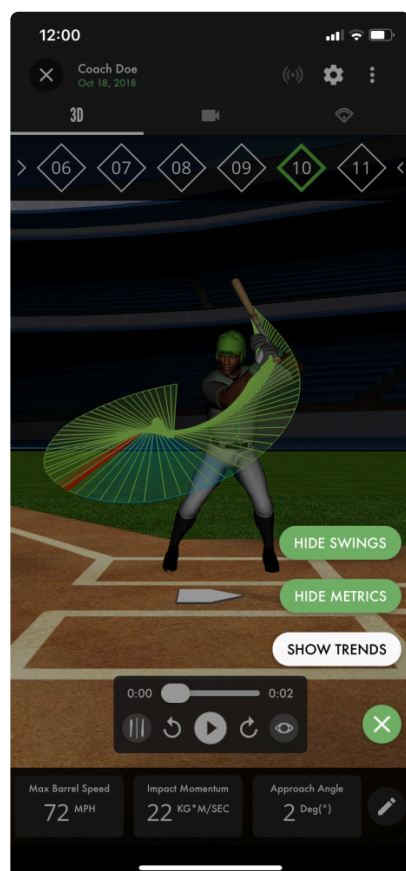
### Swing Count

Your swings will appear across the top of the page. Each individual swing will appear as a diamond with a number inside. As swings come in, you will see a green bar go across the top of the page. You can click on a previous swing to view its metrics. You are able to scroll through the swings by dragging your finger

across the row of swings. To close this top drawer select the green circle in the lower right hand corner and then select **Hide Swings**. Once done, select the white 'X'.

## Metrics

Your metrics will appear across the bottom of the page. Each metric is represented in a grey rectangle. The metric name will appear at the top of the rectangle. The metric reading for a swing will appear in large white letters with the units of measurements. You are able to scroll through your metrics by dragging your finger across the drawer. To close this bottom drawer select the green circle in the lower right hand corner and then select **Hide Metrics**. Once done, select the white 'X'.



Within a session, you have the ability to view the trend of a specific metric over the course of your swings. To see the trend line, select the green circle in the lower right hand corner and then select **Show Trends**. A chart with a trend line will pop up. At the top of the graph will be the name of the metric you are viewing along with the units of measurement in parenthesis. To change the metric you are viewing, select the downward facing green arrow. Each white dot on this chart represents a swing, the green line connecting these dots is your trend line. If you click on a dot you will see the background change to that swing and the metric reading for that metric appear in a white box with green lettering. To close the Trends view, select the downwards facing, grey arrow at the top of the Trends view. Then select the white 'X' to get back to the session view.

## Editing Metrics and Trend View

To edit your metrics that appear in your swing view, select the grey circle with the white pencil to the right of your metrics. You'll be taken to a page that says **Metric Preferences**.

## Competition Level

In your Trend View, you have the ability to compare your metrics against the top 15% of different Competition Levels. It's a helpful way to see where you stack up in your own Competition Level or where your metrics need to be to reach the next level! On the Metric Preferences page you'll see **Competition Level** with a switch beside it. To see the top 15% for your Competition Level make sure the switch shows green. If it shows white, tap on the switch and it will flip to green.

Once it's flipped green you'll see **"Compare to..."** and a downward facing green arrow. To change the Competition Level, select the downward facing arrow and scroll till you find the Competition Level you want. Once on your desired Competition Level select the now upward facing green arrow.

When you go back to your Trend View, you will now see a bronze line across each graph. There will be a number with (Top 15%) beside it. The number represents the average for that metric for that select Competition Level.

## Metrics

Below Competition Levels you'll see **Metrics**. Beside each metric you'll see a switch. *Green* means on. *White* means off. You will want the switch to show green next to each metric you want to be able to view on your Swing View.

To the far right of each metric you'll see 3 stacked lines. Press and hold on these lines and you can rearrange where that metric sits on the list. This will change the order that the metrics appear in on your Swing View.

Once you are done editing your metrics select **Done** in the upper right hand corner. You'll be taken back to your Swing View

## Options Menu

In the upper right hand corner you'll see three (3) icons: a dot with curved lines on either side, a gear and three (3) stacked dots. The dot with the curved lines indicates if your sensor is connected or not. It will show *green* when a sensor is connect and *grey* when there is no sensor connected. Select the three (3) stacked dots. This is your options menu. By selecting this, it will open up with three (3) different options. You'll see a star, 3 dots connect by lines and a trash can. To favorite a swing, click on the star. To share the swing, click on the icon that is 3 dots connect by lines. It will pull up how you want to share this swing. *This will share a screenshot of the current screen you are on.* To delete the swing, click on the trashcan. Once done, select anywhere on the screen.

Select the gear icon, this is your session settings menu. Here you can set what type of batting session you are doing, add sessions notes or add what bat you are using. To add your bat select the green rectangle that says **Change**. Select a bat from your list or add a new bat by selecting **Add A Bat**. Once done select **Save** or the 'X' in the upper left hand corner. To exit session settings select the grey, downward facing arrow.



The sensor will need to register an impact in order to record data. Dry swings will not capture data.



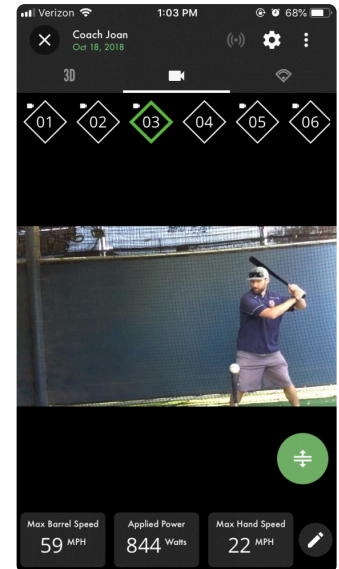
## 11.2. Video

### Welcome to Video View!

At the top of the page you'll see three (3) icons: *3D*, *a video camera* and *a baseball field*. The video camera should be highlighted white.

To record video, just press the red record button at the bottom of the screen! Our video records in a “*Set and Forget*” mode. So once you press the record button to start, you won't need to press it again! The video will be automatically cut and saved after each swing.

Swings will have a small, white video icon next to them to indicate that there is a video saved with that swing. When looking at a past session and wanting to view a video, select the video icon at the top of the page once you enter the session and then select the swing. The video will begin to play. Selecting the video screen itself, will pull up video controls on the screen. You can drag the video bar to go through the video in slow motion.



### Swing Count

Your swings will appear across the top of the page. Each individual swing will appear as a diamond with a number inside. As swings come in, you will see a green bar go across the top of the page. You can click on a previously swing to view it's metrics. You are able to scroll through the swings by dragging your finger across the row of swings. To close this top drawer select the green circle in the lower right hand corner and then select **Hide Swings**. Once done, select the white 'X'.

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Within a session, you have the ability to view the trend of a specific metric over the course of your swings. To see the trend line, select the green circle in the lower right hand corner and then select **Show Trends**. A chart with a trend line will pop up. At the top of the graph will be the name of the metric you are viewing along with the units of measurement in parenthesis. To change the metric you are viewing, select the downward facing green arrow. Each white dot on this chart represents a swing, the green line connecting

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Once it's flipped green you'll see "**Compare to...**" and a downward facing green arrow. To change the Competition Level, select the downward facing arrow and scroll till you find the Competition Level you want. Once on your desired Competition Level select the now upward facing green arrow.

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Select the gear icon, this is your session settings menu. Here you can set what type of batting session you are doing, add sessions notes or add what bat you are using. To add your bat select the green rectangle that says **Change**. Select a bat from your list or add a new bat by selecting **Add A Bat**. **Once done select \*Save** or the 'X' in the upper left hand corner. To exit session settings select the grey, downward facing arrow.



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## 11.3. Damage Potential

### Welcome to Damage Potential!

At the top of the page you'll see three (3) icons: *3D*, a *video camera* and a *baseball field*. The baseball field should be highlighted white.

This view shows the potential damage done by your swing. You'll be able to see your *potential* Exit Velocity along with *potential* Carry Distance. Keep in mind this is **potential** and not *actual*. Damage Potential assumes perfect contact was made with a ball off a tee.

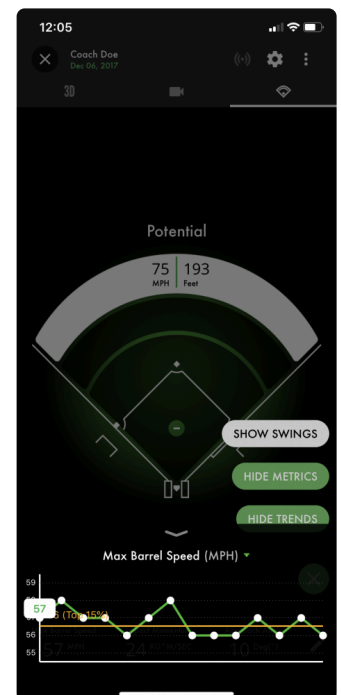
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Viewing in session trend line

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## 12. Navigating Groups

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**Create player groups for quick access to swing history & easy profile switching during sessions!**

## 12.1. Player View

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To view groups select the three stacked lines in the upper left hand corner of your screen. Then select Groups from the menu that slides out.



## 12.1.1. Group Member

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You'll see a green panel that says **Group Member** below this panel will be the groups that you are a member of. Select a group by clicking on it's name. Once inside the group you'll see all of the group members listed. As a member of a group there are several actions you can do: *View Other Members* or *Remove Yourself from the Group*.

### Viewing Other Members

You are able to view another group member's history or record data as that player. However, you'll need that players permission to do so. Click the players name. You'll see a **Calendar icon** and a **Bat icon**. The **Calendar icon** will take you to that players history. The **Bat icon** will allow you to collect data in that players account. The *bat icon* will be lit up when a sensor is connected. If a sensor is not connected than that option will not be available.

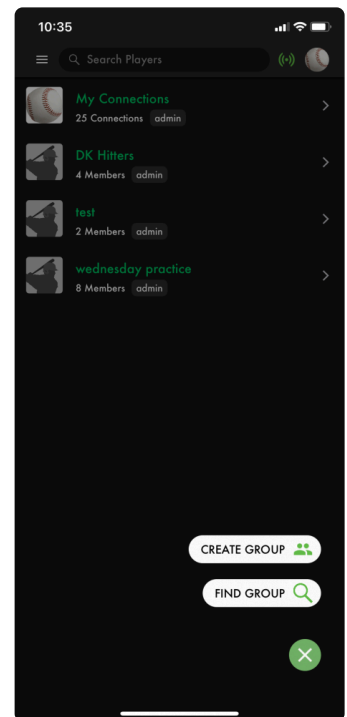
### Removing Yourself From the Group

To remove yourself from a group you are currently in, select the **Trashcan icon** in the upper right hand corner. You will be asked to confirm this removal.

## 12.1.2. Finding a Group

To find a group select the green circle with white + in the lower right hand corner of the page. Then select **Find Group**.

At the top of the next page, you'll see a grey bar that says "**Search**". Select inside of the grey search bar. Type in the name of the group you want to join and then select **Search**. From the results that appear, select the **Join** option on the correct group. If the group has an *open* privacy setting then you will be added right away. If the group has a *close* privacy setting, a request will be sent for the admin to approve you joining the group.



Groups with privacy settings marked as **Secret** will *not* be searchable.

## 12.2. Coach View

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**To view Groups select the View Groups option in the bottom of your home page.**

You can also reach **Groups** by selecting the three (3) stacked lines in the upper left hand corner of your screen. Then select **Groups** from the menu that slides out.

## 12.2.1. Creating a Group

To create a group select the green circle with white + in the lower right hand corner of the page. Then select **Create Group**.

Here you'll be asked for a **group name**, **group description** (*optional*) and **privacy settings**.

There are three (3) different settings for privacy: **Open**, **Closed** and **Secret**.

**Open:** In the Open privacy settings, a group is searchable as well as able to be joined for any players. Players can see each other in the group but need to log in to a group member's account to view or record data. Admin has full access.

**Closed:** In the Closed privacy settings, a group is searchable as well as able to be *requested* to join from players. Players can see each other in the group but need to log in to a group member's account to view or record data. Admin has full access.

**Privacy:** In the Secret privacy settings, a group is not searchable. Players cannot see other members in the group. Admin has full access.

The screenshot shows the 'CREATE GROUP' screen in the SwingTracker app. At the top, there's a status bar with the time 10:35 and battery level. Below that, a 'Cancel' button and a 'CREATE GROUP' title. The main form has three sections: 'Group Name' with a text input field, 'Description' with a text input field, and 'Group Type' with three radio button options: 'Open', 'Closed', and 'Secret'. The 'Open' option is selected. Below the radio buttons, there's a note: 'Select a group type in order to determine the level of privacy associated with your group.' At the bottom, there's a green 'Save' button.

## 12.2.2. Admin Abilities

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As an Admin of the group you have the ability to view player's history, record swings in a player's account and generate a Swing Fingerprint for your players.

The subscription status of a player's account may restrict some of these abilities. If a player's account is **unsubscribed**, you will **not** be able to view any of their history. You will also have a limited amount of metrics to view when recording a session. Coaches cannot run Swing Fingerprints for unsubscribed players.

When you are in a group, you can select a player's name from the list of players. You'll see a **Calendar icon**, a **Fingerprint icon** and a **Bat icon**.

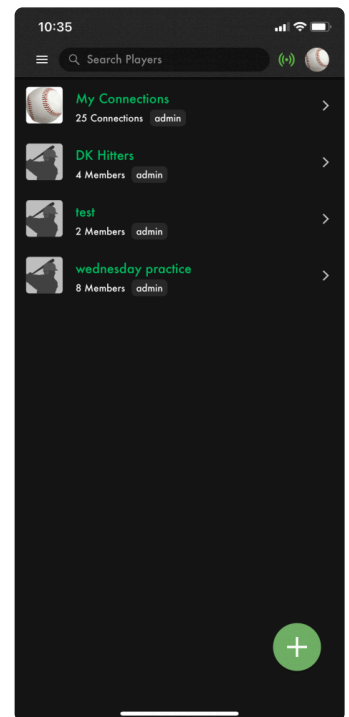
1. The **Fingerprint icon** will take you to the Swing Fingerprint generate page. Here you will select the sessions you'd like to generate a Swing Fingerprint from. You will need at least *10* swings to generate a Swing Fingerprint. We suggest using between 50-100 swings. Tap on the sessions you want to use for your Swing Fingerprint (selected sessions will show a green and white check mark). Then select **Generate**. For more information on Swing Fingerprint [click here](#).
1. The **Calendar icon** will take you to that players history.
1. The **Bat icon** will allow you to collect data in that players account. The *bat icon* will be lit up when a sensor is connected. If a sensor is not connected than that option will not be available.

## 12.2.3. Group Admin

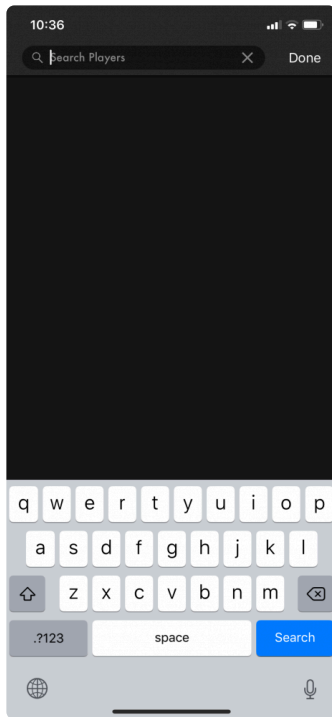
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If you create a group, you will be the admin of the group. Admins have the ability to promote other members to admin status. To do this access the group by logging in through the [Web App](#).

The Group Admin is the administrator of the group. They have the ability to view and access every player account in the group as well as add, create or move any players. The Group Admin also has the ability to edit the group itself such as changing the group name and description or the privacy features.



## 12.2.3.1. Add a Player



The “**Add Player**” option is to add users to your group who already have an existing DK account. If you are creating an account for a new player, you’ll want to select “[Create Player](#)”

To add a player to your group, select the three (3) stacked dots in the upper right-hand corner of your group’s page. You’ll see an option for “**Add Player**”. Select “**Add Player**”.

At the top of the next page, you’ll see a grey bar that says “**Search**”. Select inside of the grey search bar. Type in the player’s name with the key board that comes up and then select **Search**. Select the player’s name from the results that appear and then select the white circle that appears to the right of their name. This will send an invite to that player’s account. **The player you are inviting will need to accept the invitation by going into the groups section of their own account. They’ll see the group they are being invited to and will have the option to accept or decline.**



If there are multiple players with the same name, try searching with the email address that player uses for their account. This ensures that you’re adding the correct player.

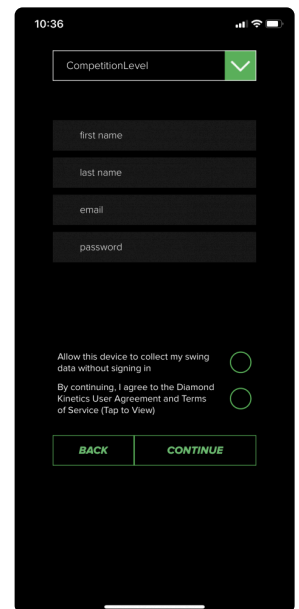
## 12.2.3.2. Create a Player

To create a player in a group select the three (3) stacked dots in the upper right-hand corner of your group's page. You'll see an option for **"Create Player"**. Select **"Create Player"**.

Next you'll be take to a registration page where you'll create the player's profile. You'll be asked for the following information:

- Competition Level
- First and Last Name
- Email Address
- Password

Remember, you are creating an actual account for this person. This is *not* another profile under your account but a whole new account for this player. They will be able to use the credentials to log into the app on their own.

A screenshot of a mobile app interface for creating a player. At the top, the time is 10:36. The form has a dark background with white text. The first field is 'CompetitionLevel' with a green checkmark icon to its right. Below it are four text input fields: 'first name', 'last name', 'email', and 'password'. At the bottom, there are two toggle switches. The first toggle is labeled 'Allow this device to collect my swing data without signing in' and is currently turned off. The second toggle is labeled 'By continuing, I agree to the Diamond Kinetics User Agreement and Terms of Service (Tap to View)' and is currently turned on. Below the toggles are two buttons: 'BACK' and 'CONTINUE'.

### DK Tip

Each individual account requires a unique email address to be set up.



## 12.2.3.3. Edit Group

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To edit a group, select the group from your groups list. Once in the group you'll see three (3) stacked dots in the upper right-hand corner, select that for your groups menu. You'll see an option for **Edit Group**.

Here you'll be able to Edit your group name, group description and group type (privacy settings). Once your edits are complete, select **Save** and you'll be taken back to that group's page.

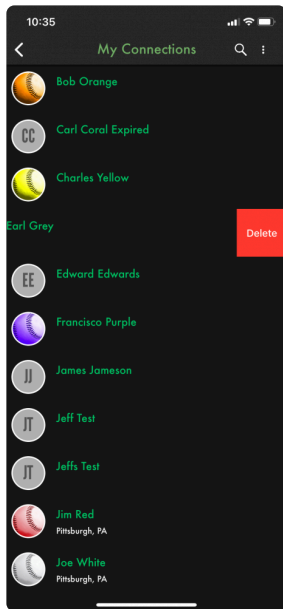
## 12.2.3.4. Delete Group

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To delete a group go into the group from your Groups List. Select the three (3) stacked dots in the upper right-hand corner. Then select the **Delete Group** option. At the bottom of the page you will be asked if you would like to delete the group. Select **Delete Group**.

## 12.2.3.5. Removing a Player

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Have players in your group that you want to remove? To remove players from a group, go into the group you'd like to remove the player from. Find the player's name in the group. Press on the player's name and drag your finger to the left of the screen. You'll see a red **Delete** appear to the right of the name. Click **Delete**.

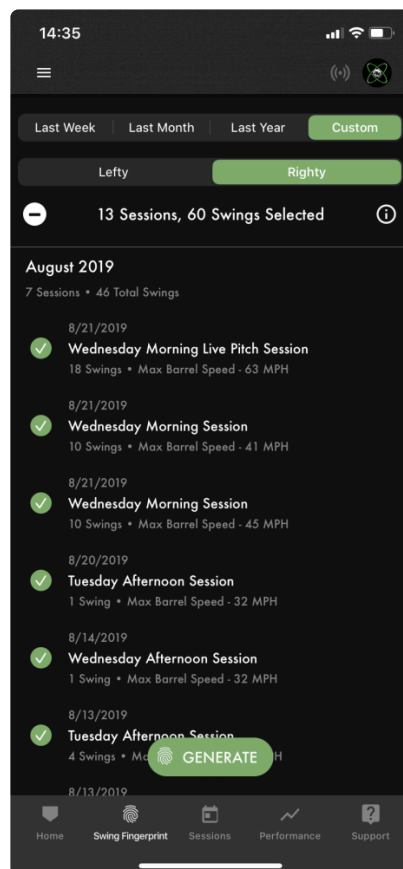
# Swing Fingerprint Overview

## Welcome to Swing Fingerprint!!

*Swing Fingerprint combines a personalized swing analysis with a visual 3D heat map of a hitter's hot and cold zones.*

We suggest that you use 50-100 swings to generate a Swing Fingerprint that most accurately represent your overall swing.

To start, you will need to [generate](#) a Swing Fingerprint!



1. Select the **Fingerprint** icon from the menu at the bottom of your Dashboard
2. Tap on the sessions you want to use for your Swing Fingerprint (selected sessions will show a green and white check mark)
3. Select **Generate**



You can automatically select all of the sessions from the **Last Week**, **Last Month** or the **Last Year** by using the options at the top of the page. You can also customize which sessions you want by selecting the **Customize** option.

## Now you have your Swing Fingerprint!

You'll be taken to a screen that shows your 3D heat map made up of colored cells and arrows. The cells range in color from blue to red. The more blue a cell is, the lower the potential distance is for balls hit in that location of the strike-zone. The more red a cell is, the higher the potential distance is for balls hit in that location of the strike-zone. **Red** cells are the locations in which you hit the ball the best. **Blue** cells are the locations that need improvement.

Each cell will have an arrow inside of it. This arrow represents your average Barrel Slot of swings to hit pitches in that location. Barrel Slot is the direction the sweet spot of the bat is going for 6 ball lengths prior to the impact point.



✿ Explore your *Swing Fingerprint* and learn how to customize how you view it!

## Once you've checked out your Swing Fingerprint, take a look at your [Insights](#)!



Select the clipboard icon in the top right of your screen to get to your Insights. Here you'll learn an overview of your type of swing, what's good about it and what needs to be worked on! These Insights are based off of your Swing Fingerprint. As your Swing Fingerprint changes, your Insights will change as well.



If you have a specific Swing Fingerprint question in mind, check out our [Swing Fingerprint FAQ](#) or reach out to our support team!

# Swing Fingerprint For Coaches

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## Welcome to Swing Fingerprint!!

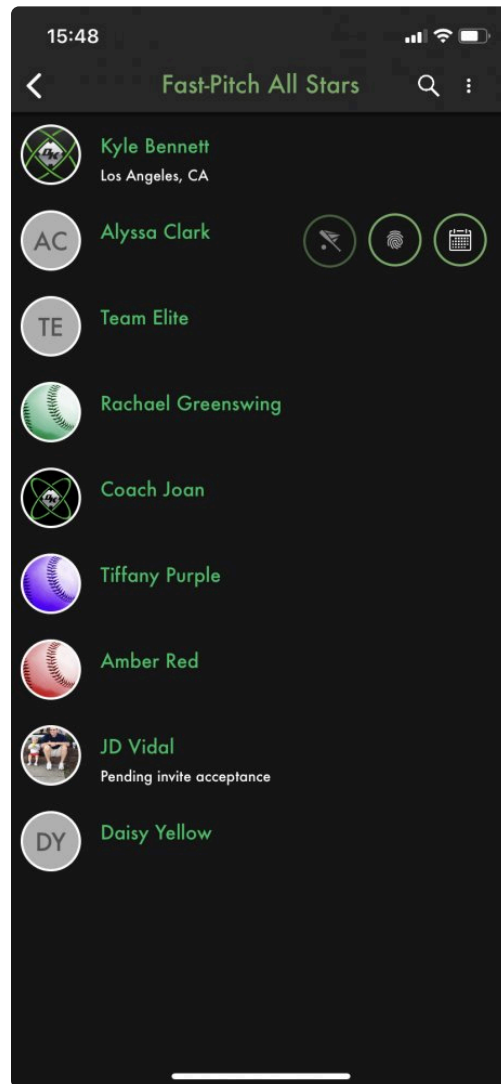
*Swing Fingerprint combines a personalized swing analysis with a visual 3D heat map of a hitter's hot and cold zones.*

Once you are in your group list, select a group, then select a player's name from the list of players that appears. You'll see a Calendar icon, a Fingerprint icon and a Bat icon.

The **Fingerprint icon** will take you to the Swing Fingerprint generate page. Here you will select the sessions you'd like to use to generate a Swing Fingerprint for one of your players. You will need at least 10 swings total across selected sessions to generate a Swing Fingerprint. We suggest using between 30-60 swings. Tap on the sessions you want to use for your Swing Fingerprint (selected sessions will show a green and white check mark). Then select **Generate**. For more information on Swing Fingerprint [click here](#).



You can run as many Swing Fingerprints as you'd like for your subscribed players! However, you can only run a total of 5 Swing Fingerprints across all of the unsubscribed players in your groups. Those players will need to subscribe for you to view their Swing Fingerprints.





## 13. USA Baseball Drills (SwingTracker Baseball)

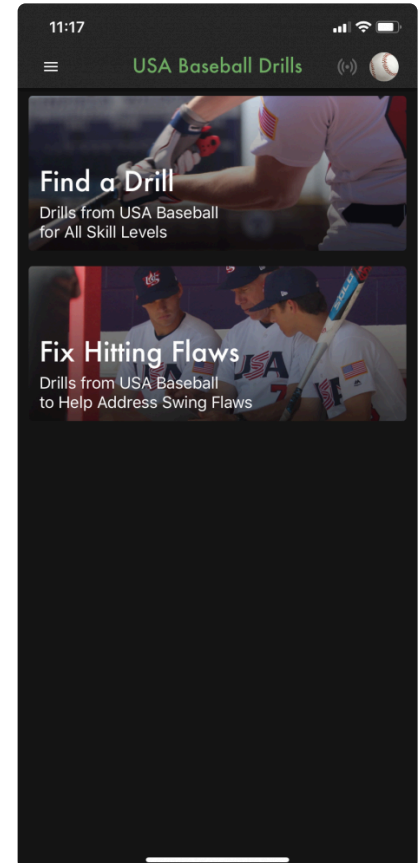
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**With the USA Baseball Drills feature in the SwingTracker Baseball app, you can learn new drills and fix common hitting flaws.**

USA Baseball Drills are available from the main menu (three stacked line in the upper right hand corner) on the dashboard. The USA Baseball Drills feature contains a library of informational videos and PDF's broken up into two sections: **Find a Drill** and **Fix Hitting Flaws**.

**Find a Drill** allows a player to browse a collection of USA Baseball drills. When they find a drill they like, they can view a video or PDF of the drill. In the description of these drills, you can learn what specific metrics these drills will improve and what hitting flaws they might fix.

**Fix Hitting Flaws** will have a collection of common hitting flaws that players may have. The videos in this section explain what these common hitting flaws are, how they occur and how to correct them.



You do not need a SwingTracker Sensor connected to use the USA Baseball Drills feature.

## 14. Disconnected Swings

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When your SwingTracker sensor is turned on, it will track any swing that is taken and makes contact whether connected to a device or not.

When the sensor **is** connected to a device, with the SwingTracker app open, the sensor transfers all of the swings to the app and the data is stored on the Diamond Kinetics server where it can later be pulled down and viewed.

When the sensor **is not** connected to a device, the sensor will save any swings that are taken and make contact on it's internal memory. These swings can later be uploaded to the app and the Diamond Kinetics server, where the user can view metrics and other swing information. Using the app this way is referred to as **Disconnected Mode**. Disconnected swings can be uploaded [directly to your account](#) or [to a group member's account](#).

Unwanted disconnect swings can also be deleted by selecting the “**Delete Swings**” option you are given.



The sensor will need to register an impact in order to record data. Dry swings will not capture data.

# 14.1. Creating a Session

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## How do I upload disconnected swings to my account?

1. Connect the sensor via BlueTooth to your device
2. Open the SwingTracker App and log in
3. You will be prompted that there are stored swings on your sensor and be asked what to do with them.
4. Select **Create Session** (you'll then see the swings transfer into the app)
5. This next screen is your session screen. You can click through all of your disconnected swings to view the data. This data will now also be available in your history.
6. When you're done viewing your data, select the "**X**" icon in the upper left-hand corner of the screen



The disconnected swings that are stored include "swing errors" as well. So you may see "30 *stored swings*" but only have a session of 28 swings. This is because 2 of those swings were errors.

## 14.2. Assign to a Group Member

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### How do I assign disconnected swings to a group members account?

1. Connect the sensor via BlueTooth to your device.
2. Open the SwingTracker App and log in.
3. You will be prompted that there are stored swings on your sensor and be asked what to do with them.
4. Select **Assign to Player**.
5. You'll be taken to your Group list, select the group the player that you want to assign swings to belong to.
6. Select the player's name that you want to assign swings to.
7. To the right of the player's name you'll see a bat icon and a calendar icon. Select the **bat icon**.
8. You'll be taken to a session page where you'll see the disconnected swings start to populate the session. You can click through all of these swings to view the data. This data will now also be available in this player's history.
9. When you're done viewing the data, select the **"X"** icon in the upper left hand corner of the screen

# 15. Swing Metrics

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The baseball swing has been one of the most studied motions in sports, and yet there are still a great number of questions for individual players regarding what it takes to perfect the art of hitting. At Diamond Kinetics we understand how complex the swing is and the variety of swing approaches there are. Because of this, we crafted SwingTracker.

Built around revolutionary discoveries in motion analytics, SwingTracker removes all the guesswork from swing analysis and delivers instantaneous data that allows coaches and players to identify opportunities for technique improvement.

## 15.1. Power

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Power at its core is a measure of energy and how that energy is transferred to the ball at contact. Power is directly related to speed, but also includes such important factors as the mass and acceleration of the bat. There are three metrics that make up the Power category: *Applied Power*, *Max Acceleration*, and *Impact Momentum*.

# 15.1.1. Applied Power

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## The Science Behind It

The amount of power – measured in watts – that is applied to the bat during the swing by the hands and body.

## What It Means For Hitters

Higher Applied Power causes the bat to reach a higher momentum quicker and thus allows for the batter to hit the ball further. Plus, more Applied Power allows for the batter to start a swing later, thus giving more time to recognize a pitch and still hit the ball far.

## What It Means For Coaches

Since the distance a ball travels after contact depends on barrel speed at impact and the weight of the bat, more Applied Power during the swing means that it takes the batter less time to reach their Max Barrel Speed.

Furthermore, more Applied Power means the batter is transferring more energy from his body to the bat, and then to the ball. This will result in more bat speed and ultimately more power.

## Real World Similarity

Cars with higher powered engines go from 0-to-60 miles per hour faster than cars with lower powered engines. Therefore, a batter who generates more Applied Power during a swing would have a 'higher powered engine', thus allowing for the bat to reach a higher swing speed quicker.

## DK Pro Tip

One can improve their Applied Power by integrating the lower body in sequence with the upper body.

Furthermore, a heavier bat will also result in higher Applied Power because there will be more energy transferred from the body to the bat in order to swing the heavier bat. However, higher Applied Power will only result if barrel speed is maintained with the heavier bat.

## 15.1.2. Max Acceleration

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### The Science Behind It

Maximum Acceleration captures how quickly a batter speeds up their swing from start until impact, and relates directly to the force and torque applied to the bat.

### What It Means For Hitters

Higher Max Acceleration allows you to start a swing later – thus giving you more time to recognize the pitch – but still produce a high rate of bat speed and momentum in the bat.

### What It Means For Coaches

By applying more force and torque – and thus having more Max Acceleration – one can get the bat up to speed in a shorter time, allowing the batter to wait longer to recognize the pitch.

### Real World Similarity

When two cars accelerate from 0-to-60 miles per hour, the car with the highest acceleration gets to 60 MPH the quickest. Therefore, a batter with a quicker acceleration rate from the beginning of the swing until impact will be able to wait longer than his counterpart to identify a pitch, thus allowing for more time to identify if the pitch is a ball or strike.

### DK Pro Tip

More Maximum Acceleration also allows the batter to get the bat up to a higher speed over a given period of time, thus generating more exit velocity after making contact on a squared-up ball.

A bat that is too heavy, though, could potentially affect the Max Acceleration of a swing.



## 15.1.3. Impact Momentum

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### The Science Behind It

Impact Momentum is the amount of momentum in the bat when the bat makes contact with the ball. It is determined by barrel speed at impact, and the weight of the bat.

### What It Means For Hitters

The higher the Impact Momentum, the further the ball will travel after contact.

For every additional +1 of Impact Momentum, the batter increases exit velocity by + ~1.5 mph. For balls with a HR trajectory, every + ~1.5 mph of exit velo = + ~10 feet of carry.

With this in mind, the difference between an Impact Momentum score of 24 and one of 25 is + ~1.5 mph of exit velocity and + ~10 feet of carry for a home run trajectory fly ball.

### What It Means For Coaches

This measure is the one most closely associated with the power of the hitter. This is because higher momentum directly relates to further hit balls.

### Real World Similarity

If a sports car and a dump truck are both moving at 60 miles per hour, the dump truck – in this case the heavier object – has more momentum than the sports car. Therefore, if two batters both had the same swing speed, the batter using the heavier weighted bat would have more momentum, and thus be able to hit the ball further after contact.

### DK Pro Tip

A heavier bat may lead to higher momentum, and therefore more exit velocity and distance for a hit ball – as long as the heavier bat does not cause too much loss in barrel speed.

## 15.2. Speed

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Bat speed is a crucial factor in creating a high amount of ball exit velocity, which directly correlates with how far and how fast the ball will travel after impact. There are three metrics that make up the Speed category: *Speed Efficiency*, *Max Hand Speed* and *Max Barrel Speed*.

## 15.2.1. Max Barrel Speed

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### The Science Behind It

The maximum speed of the bat's barrel during your swing, at a point 20% from the tip of the bat.

### What It Means For Hitters

Max Barrel Speed greatly affects both the distance and speed at which the ball travels after impact. According to Diamond Kinetics technical advisor Dr. Alan Nathan, "bat speed is roughly six times more important to batted ball exit velocity than the incoming velocity of the pitch."

### What It Means For Coaches

Faster barrel speed leads to more hard hit balls and a higher ball exit velocity, which in turn, increases the chance for the ball to result in a hit.

### DK Pro Tip

Max Barrel Speed directly correlates with the SwingTracker metric Impact Momentum. Users will see high Impact Momentum scores, assuming the same barrel speed is maintained at contact with a heavier bat as with a lighter bat

## 15.2.2. Speed Efficiency

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### The Science Behind It

Speed Efficiency calculates the exact percentage of Max Barrel Speed that occurs at the precise moment of impact.

### What It Means For Hitters

It is ideal for the barrel of the bat to be moving at its maximum speed – 100% Speed Efficiency – when it contacts the ball, in order to maximize distance and exit velocity. Even a small drop in Speed Efficiency can have a large effect on batted ball outcome

### What It Means For Coaches

A high Speed Efficiency score means the optimum amount of Max Barrel Speed occurred at the moment of impact, thus increasing the chances for higher exit velocity and optimal batted ball outcome potential.

### DK Pro Tip

According to Diamond Kinetics' Technical Advisor Dr. Alan Nathan, "bat speed is roughly six times more important to batted ball exit velocity than the incoming velocity." With that in mind, it is imperative to have maximum barrel speed occur at impact in order to maximize your Speed Efficiency and potentially your chance for a hard-hit ball with a high amount of ball exit velocity.

## 15.2.3. Hand Speed

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### The Science Behind It

The maximum speed of your hands during the swing.

### What It Means For Hitters

Faster hand speed, along with faster bat rotation, leads to faster barrel speed which positively affects the ball exit velocity and distance a ball travels.

### What It Means For Coaches

Faster hand speed will help the batter get the bat in the hitting zone sooner. But keep in mind, a bat that is too heavy, could potentially decrease hand speed.

### DK Pro Tip

Max Hand Speed correlates with Trigger To Impact relative having excellent quickness and timing in the swing. This is necessary in order to make consistent, solid contact with the ball.

## 15.3. Control

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Having Speed, Quickness and Power means very little unless you can put the bat on the ball. Control directly correlates with the path, angle and plane of the swing and is a large determinant of ball flight and ball contact point. There are three metrics that make up the Control category: *Approach Angle*, *Hand Cast Distance* and *Distance In The Zone*.

## 15.3.1. Hand Cast

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### The Science Behind It

Hand Cast Distance measures how far the hands move – in a lateral direction – away from the player's load position at the start of the swing, to the point where the hands are at impact.

### What It Means For Hitters

Hand Cast Distance can be the result of a true hand cast away from the body, or because of a shoulder turn during the load process.

A larger Hand Cast Distance indicates an inefficient hand path to the ball and can cause a decrease in power metrics. Understanding this number will help the player create an efficient path with the hands to the ball.

### What It Means For Coaches

Hand Cast Distance allows coaches and players to quantify if a player is staying inside the ball, swinging with his 'hands back' and keeping the bat in the best possible position – over the back shoulder – before uncoiling the hands and the bat toward the pitch.

### DK Pro Tip

Having a large amount of Hand Cast Distance makes it difficult for a batter to hit the fastball, and/or adjust to hitting balls that occupy the middle or inside part of the plate.

In an ideal swing that results in a minimal amount of hand cast, the hands stay close to the shoulder, with the hands and barrel staying inside the baseball before the barrel gets on plane with the path of the pitch.

## 15.3.2. Attack Angle

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### The Science Behind It

Attack Angle is the angle/direction of your swing plane just prior to, and at the moment of impact.

### What It Means For Hitters

When evaluating and analyzing Attack Angle please note that a swing that is “on plane” will result in a slightly positive Attack Angle.

While the optimal Attack Angle is dependent on the type of pitch, it typically needs to be between  $+5^{\circ}$  degrees and  $+15^{\circ}$  degrees in order to hit a hard line drive and between  $+20^{\circ}$  degrees and  $+35^{\circ}$  degrees in order to hit a home run.

A negative Attack Angle is the result of a ‘chop’ type swing and usually leads to ground balls.

### What It Means For Coaches

According to Dr. Alan Nathan’s research, the optimum launch angle of a home run is between  $+20^{\circ}$  and  $+35^{\circ}$  degrees. In order to achieve this goal, the batter must swing below the path of the incoming pitch, with the bat moving upwards in order to get a positive Attack Angle. This will ultimately lead to the desired results of the optimum launch angle for a home run.

### DK Pro Tip

Data from the 2015 MLB season shows that batters hit the most home runs (1,407) with a launch angle between  $+25^{\circ}$  and  $+29^{\circ}$  degrees and had the highest batting average (.775) with a launch angle between  $+10^{\circ}$  and  $+14^{\circ}$  degrees. In order to achieve these results, batters must have a very positive (home run) or slightly positive (line drive) Attack Angle right before and at impact.



## 15.3.3. Distance in the Zone

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### The Science Behind It

Distance In The Zone measures the length of the hitting zone along a line toward the pitcher. It is determined by the region 'swept' by the bat.

### What It Means For Hitters

A longer hitting zone means a greater opportunity for the bat to make contact with the ball and thus, gives the batter a better opportunity to put the ball in fair territory (assuming square contact is made).

### What It Means For Coaches

Distance In The Zone is the region (designated as the blue area in the 3D rendering) in which a batter can make square contact with a pitch and hit a fair ball (think of the bat at a 45 degree acute angle, a 90 degree angle and a 45 degree obtuse angle, relative to the dimensions of the field of play).

The longer the batter's hitting zone, the better chance one has at making contact with the pitch.

### DK Pro Tip

A batter who can maintain an elite Distance In The Zone score has a greater opportunity to produce a higher contact rate and put more balls into play.

Moreover, having a swing that maintains a good Distance In The Zone is also more forgiving for small errors in timing, thus resulting in more balls in play.

## 15.4. Quickness

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Quickness is critical to a hitter's success since it is directly related to timing & therefore one's potential for good contact. There is one metric that makes up the Quickness category: *Trigger To Impact*.

# 15.4.1. Trigger to Impact Time

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## The Science Behind It

Trigger To Impact is the amount of time – measured in milliseconds – elapsed from the start of your forward bat motion to the moment of impact.

SwingTracker measures Trigger To Impact from the instant the player begins accelerating the bat toward ball, until the precise moment of impact.

## What It Means For Hitters

A lower Trigger To Impact time results in a higher Quickness score. Moreover, Trigger To Impact is directly related to a batter's timing. According to Dr. Alan Nathan, "to get the highest home run probability requires swinging with a larger attack angle, keeping in mind that you will fail often if the swing is mis-timed."

## What It Means For Coaches

Improving Trigger To Impact time will:

- 1) Help the batter wait longer to identify the pitch
- 2) Help the batter determine the location of the pitch
- 3) Help the batter catch up to, and make contact with faster pitches or make adjustments mid-swing

## Real World Similarity

The amount of time it would take for a car to go from its starting point until its end point. In this instance, the end point would represent the bat making contact with the ball.

## DK Pro Tip

A bat that is too heavy may slow Trigger To Impact time and thus not allow one to maximize their swing potential.

## 16. Setting a Load Position

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Setting a load position is not necessary. If a load position is not set, a default will be used instead.

To set your load position, make sure that your sensor is attached to your bat, turned on and connected to the app.

Open up the SwingTracker app and navigate to your Profile page. To do so, select your profile picture in the upper right corner of the dashboard. Half way down the page you will see a **Load Position** option. Select this and follow the steps on the screen.



It's important to take your load position with your normal swing.

# 17. Support

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## Welcome to Diamond Kinetics Support!

Select one of the sections below.

# 17.1. Customer Support

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## Our Customer Support is available through:

1. Email (9:00am to 5:00pm Mon-Fri)
2. Phone (9:00am to 5:00pm Mon-Fri)
3. Chat (9:00am to 10:00pm Mon-Fri and 10:00am to 10:00pm Sat & Sun)

### Email

You can email us at **support@diamondkinetics.com**. Or you can fill out a support form [here](#) and it will get sent to our email!

### Phone

Give us a call at **412-223-5341 ext 1**.

### Chat

In your SwingTracker App select the Support option. You will see a **Message Us** feature. Here you can send us a message or picture and we'll get back to you!

## 17.2. Return Policy

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If the SwingTracker Sensor has been unopened and unused within 30 days of purchase, Diamond Kinetics offers a full refund. All other returns must fall under the [Manufacturer's Warranty](#)

## 17.3. Manufacturer's Warranty

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### SWINGTRACKER PRODUCTS

Diamond Kinetics, Inc. of 700 River Avenue, Pittsburgh, PA 15212, ("Diamond Kinetics") or the ("Company") provides a limited consumer hardware warranty to the original consumer user (the "Customer") of the Diamond Kinetics SwingTracker product. This limited warranty is non-transferable and does not extend to product used in any manner other than by an individual consumer, all other warranties are excluded as provided below.

### HARDWARE:

Subject to the exclusions, limitations, and conditions stated below, Diamond Kinetics warrants that the SwingTracker product will be free from defects in workmanship and materials, under normal consumer use, for a period of twelve (12) months from the original purchase date.

### LIMITATIONS AND EXCLUSIONS:

These warranties excludes (1) normal wear and tear; (2) damage caused by misuse, neglect, improper installation or testing, unauthorized attempts to modify the product, attempted servicing by anyone other than an authorized service representative of Diamond Kinetics or any other cause beyond the range of the intended use; (3) damage caused by accident, fire, water or liquids, power changes, other hazards, or acts of God; (4) use of the SwingTracker product with any non-SwingTracker device, component, such as chargers or connection cables, or service if such device, component or service causes the problem; (5) use of a Diamond Kinetics product for any rental purpose; or (6) software installed on or with the SwingTracker product. Any third-party products, including software included with the SwingTracker product, are not covered by this Consumer Limited Warranty, and the Company makes no representations or warranties on behalf of such third parties. Any warranty on such third party products is from the supplier or licensor of the third-party product.



**Important:** Do not open the SwingTracker device. Opening the SwingTracker device may cause damage that is not covered by this warranty. Only Diamond Kinetics or an authorized Diamond Kinetics service center should perform service on this SwingTracker product. Opening the SwingTracker device case shall void this warranty.

For a full look at our SwingTracker Manufacturer's Warranty, please [click here](#).



# 18. Compliance and Certifications

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Federal Communications Commission

Model: DKT003

FCC ID: 2ABWR-DKT003

Industry Canada Model: DKT003

IC: 12312A-DKT003

## Compliance Statement

### 1. FCC Interference Statement (Part 15.105 (b))

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### 2. FCC Part 15 Clause 15.21 [ Do not Modify warning]:

“Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment”

### 3. FCC Part 15.19(a)[interference compliance statement], unless the following statement is already provided on the device label: –

“This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”

### 4. FCC Module integration instructions for the End-Product Manufacturer (Required by FCC KDB 996369 D03v01) shall include the applicable items as appropriate for the radio module:

- i. Antennas – A list of antennas included; identify types

ii. Label and compliance information – advise host manufacturers to provide a physical / e-label stating, “Contains FCC ID: XXXXXYYYYYYYYY”. “Contains IC: XXXXXYYYYYYYYY” with their finished product

**5. ISED Canada RSS-Gen Notice (in English and French):**

“This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS. Operation is subject to the following two conditions:

- 1.This device may not cause interference.
- 2.This device must accept any interference, including interference that may cause undesired operation of the device.”

“L’émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes :

- 1.L’appareil ne doit pas produire de brouillage;
- 2.L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.”

**6. ISED Canada ICES-003 Compliance Label (CAN BE PROVIDED ON LABEL OR in USER MANUAL):**

“CAN ICES-3 (B)/NMB-3(B)”

## Disposal and Recycling Information

Your SwingTracker and/or PitchTracker should be disposed of separately from household waste. Take the sensor to a collection point designated by local authorities that accept batteries and other similar waste. Not all collection points accept products for free. The separate collection and recycling of your product at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

U.S. Patents: 7,021,140 and 7,234,351

# Fast-Pitch Softball Fence Distances

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Competition Level	Fence Distance
8U	110
9U	120
10U	120
11U	140
12U	140
13U	150
14U	150
15U	160
16U	160
17U	170
18U	170
Collegiate D1	180
Collegiate Other	180
Professional Minor	190
Professional Majors	190

# Baseball Fence Distances

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Competition Level	Fence Distance
8U	120
9U	150
10U	150
11U	170
12U	170
13U	210
14U	210
15U	240
16U	240
17U	260
18U	260
Collegiate D1	280
Collegiate Other	280
Professional Minor	300
Professional Majors	300