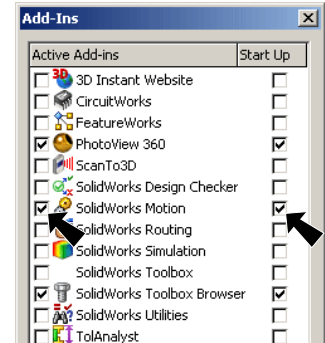


# Spinning Top Motion Study

## A. Enable SolidWorks Motion.

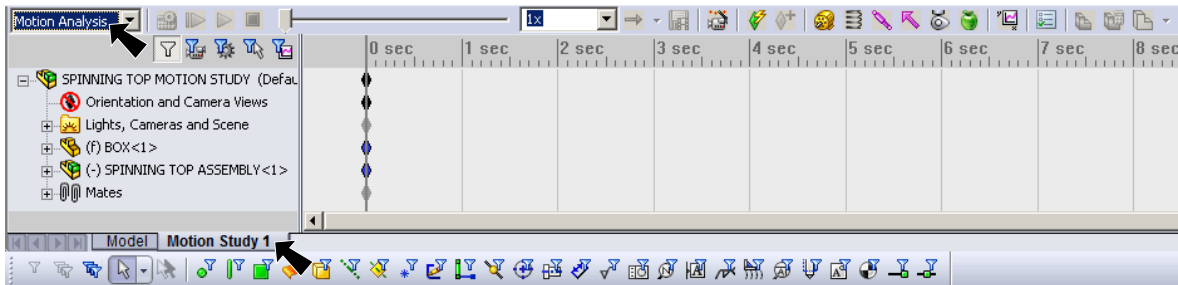
- Step 1. If necessary, open your **Spinning Top Motion Study Assembly** file.
- Step 2. If necessary, turn on SolidWorks Motion. To turn on SolidWorks Motion, click Tools Menu > Add-Ins.
- Step 3. Check **SolidWorks Motion** check box under **Active Add-Ins** and **Start-Up**, **Fig. 1**. Click OK.



**Fig. 1**

## B. Type of Study.

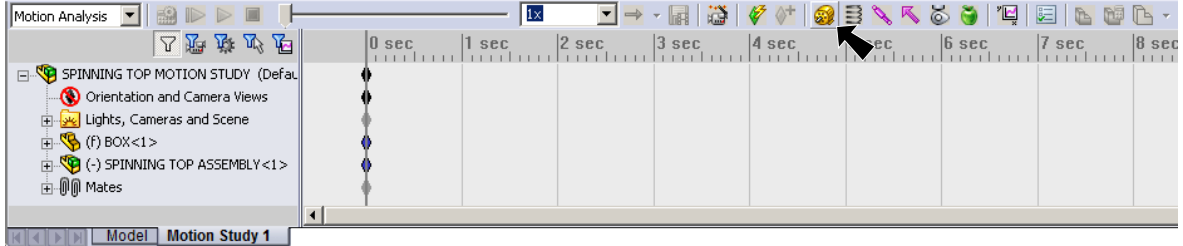
- Step 1. Click **Motion Study 1** tab **Motion Study 1** at the lower left of the graphics area, **Fig. 2**.
- Step 2. Set Type of Study to **Motion Analysis**, **Fig. 2**.



**Fig. 2**

## C. Add Motor.

Step 1. Click **Motor**  on the Motion Manager toolbar, **Fig. 3**.



**Fig. 3**

Step 2. In the Motor Property Manager set:

under Motor Type, **Fig. 4**  
select **Rotary Motor**

under Component/Direction  
**for Motor Location**  
click the **cylindrical face of Flywheel**, **Fig. 5**

for Motor Direction

**Motor direction arrow should point CW** , **Fig. 5**.

If arrow is pointing in wrong direction, click **Reverse**

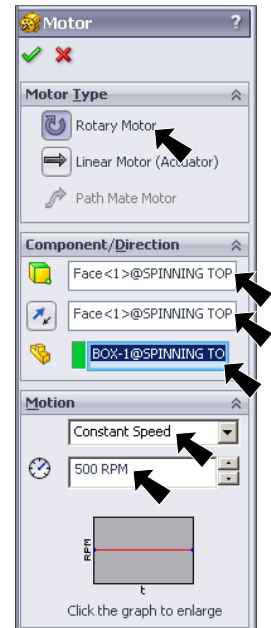
**Direction** , **Fig. 4**.

click in **Component to Move Relative to** , **Fig. 4**

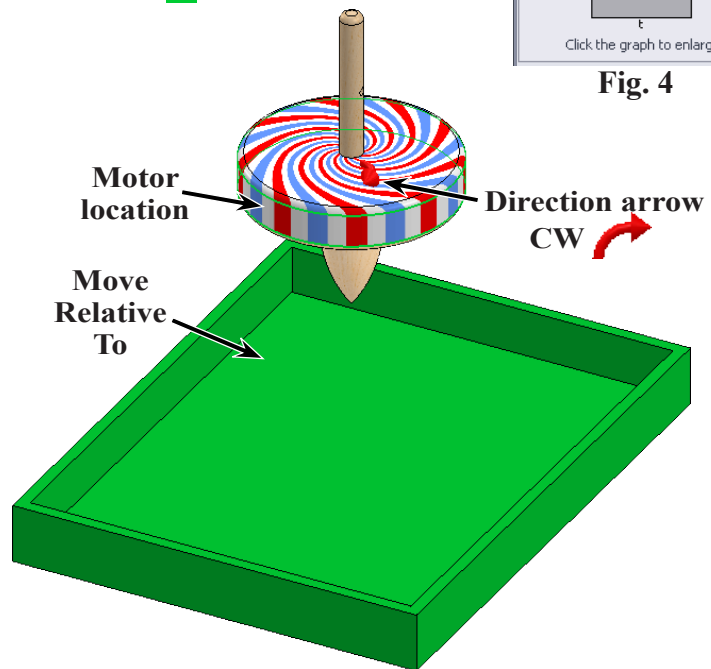
click **Box**, **Fig. 5**

**RPM 500**

click **OK** .




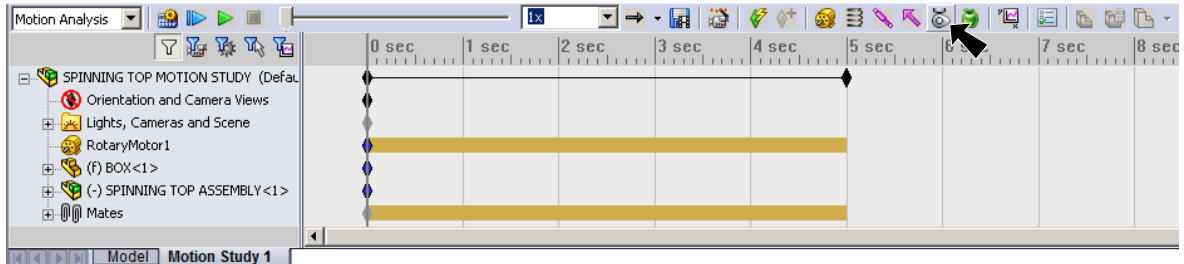
**Fig. 4**



**Fig. 5**

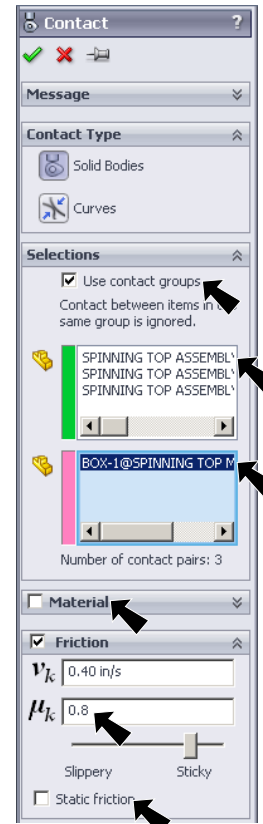
## D. Contact.

Step 1. Click **Contact**  on the Motion Manager toolbar, **Fig. 6**.




**Fig. 6**

Step 2. In the Property Manager set:  
 expand **Selections**, **Fig. 7**  
 check **Use contact groups**



**Fig. 7**

in **Group 1**  box  
 click **Axle**, **Flywheel** and **Axle Tip**, **Fig. 8**

click in **Group 2**  box, **Fig. 7**  
 click **Box**, **Fig. 8**

uncheck **Material**

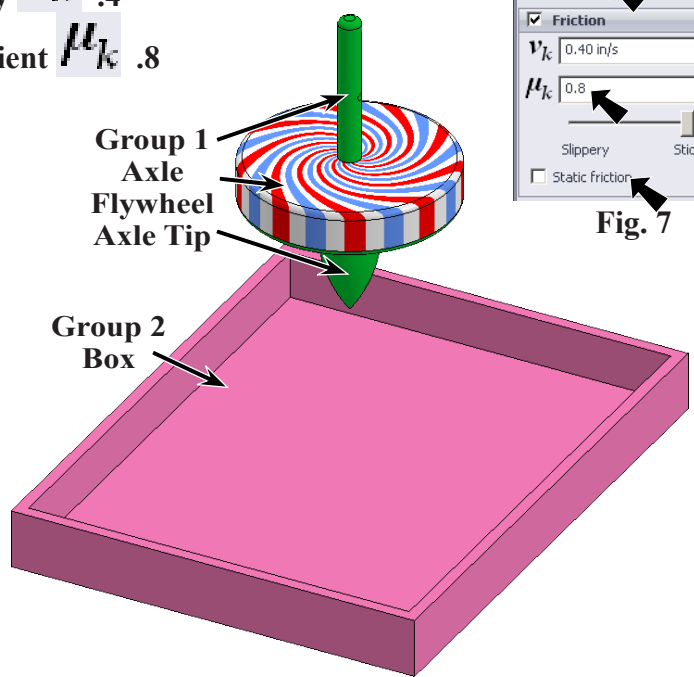
under **Friction**

**Dynamic Friction Velocity**  $v_k$  .4

**Dynamic Friction Coefficient**  $\mu_k$  .8


uncheck **Static friction**

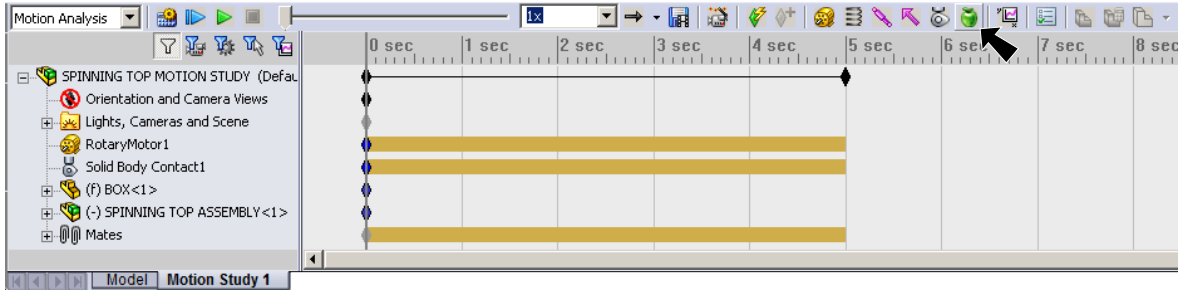
click **OK** .



**Fig. 8**


## E. Gravity.

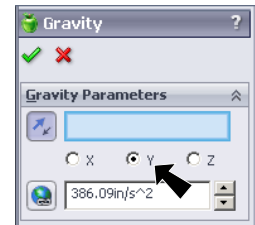
Step 1. Click **Gravity**  on the Motion Manager toolbar, **Fig. 9**.



**Fig. 9**

Step 2. In the Gravity Property Manager set:  
under Gravity Parameters, **Fig. 10**  
select **Y**

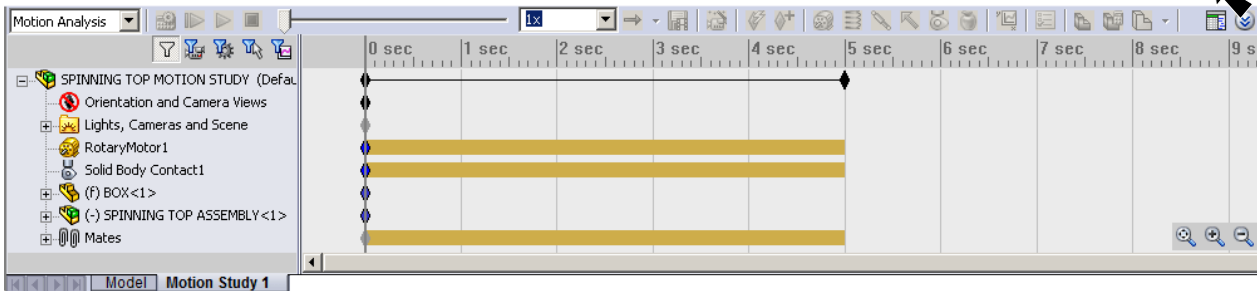
the **green arrow**  in the bottom right corner of the graphics area should **point down**, **Fig. 11**



**Fig. 10**

click **OK** .

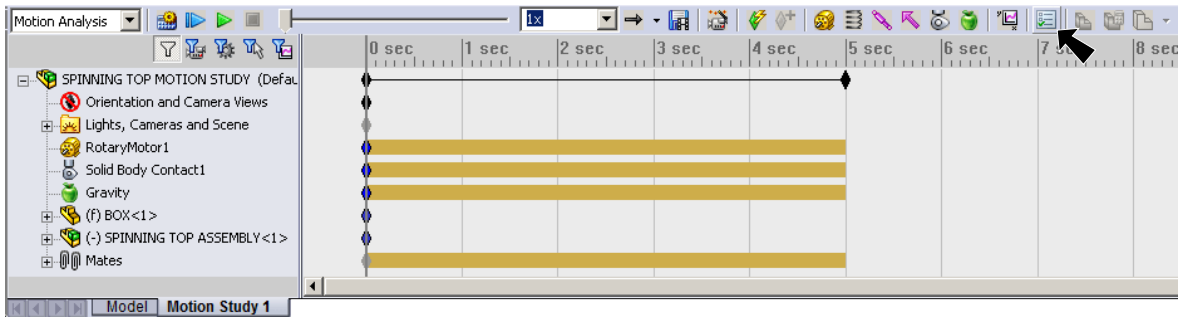
Step 3. Save. Use **Ctrl-S**.



**Fig. 11**

## F. Motion Study Properties.

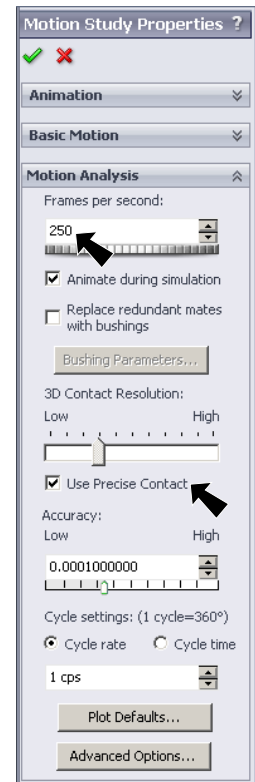
Step 1. Click **Motion Study Properties**  on the Motion Manager toolbar, **Fig. 12**.



**Fig. 12**

Step 2. In the Property Manager set:  
under Motion Analysis, **Fig. 13**  
**Frames per second: 250**  
check **Use Precise Contact**

click OK .

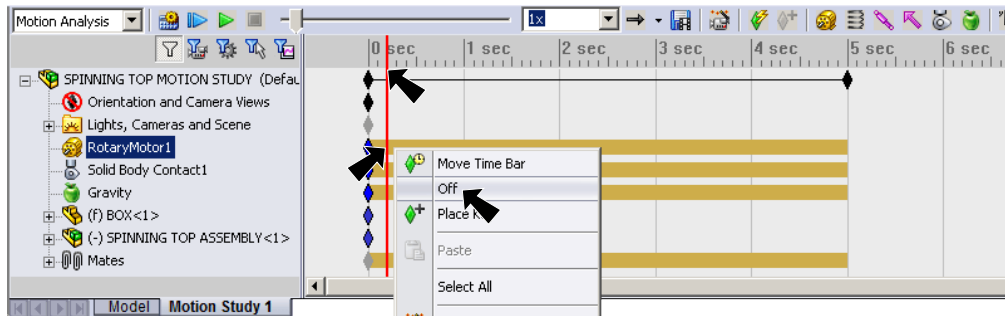


**Fig. 13**

## G. Turn Off Motor at T = .2.

Step 1. **Set Time Bar to .2 seconds.** To set Time Bar, drag the Time Bar, the gray vertical line to .2 in the Timeline, **Fig. 14**.

Step 2. To Turn off Motor, **right click** the RotaryMotor1 Timeline at **T = .2** and click **Off** in menu, **Fig. 14**.



**Fig. 14**

## H. Disable Playback View Keys.

Step 1. **Rewind Motion Study to 0 seconds.** To rewind, either **drag the Play Head** back to the beginning in the Motion Manager toolbar or **drag the Time Bar**, the gray vertical line back to 0 in the Timeline, **Fig. 15**. It's good practice to rewind before you make changes in the Timeline, otherwise you could create unwanted Keys.

Step 2. **Right click** **Orientation and Camera Views** in the Motion Manager design tree and click **Disable Playback of View Keys**, **Fig. 15**. Disabling View Keys will allow viewing Motion Study from any view.

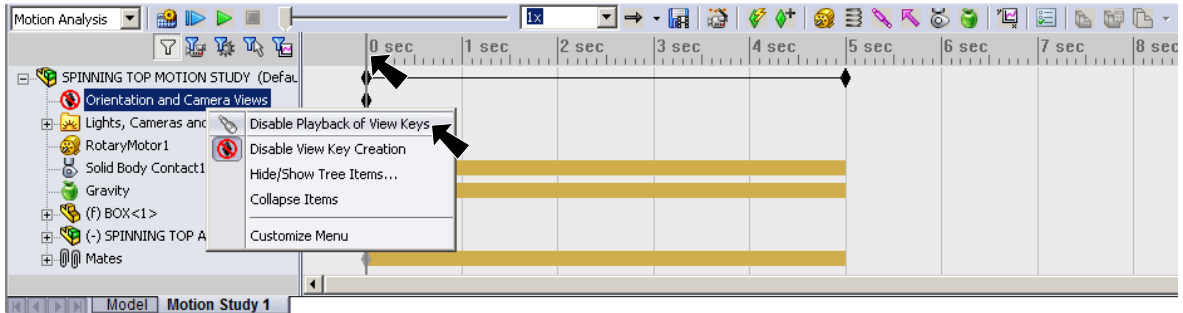


Fig. 15

## I. Set Duration.

Step 1. **Set the Motion Study duration to 4 seconds** on the Timeline. To change duration, in the top Timeline drag the **Key Point** at 5 seconds to 4 seconds, **Fig. 16**.

Step 2. Save. Use **Ctrl-S**.

## J. Calculate and Play.

Step 1. Click **Calculate** on the Motion Manager toolbar, **Fig. 17**.

Step 2. Set the **Playback Speed** to **.1**, **Fig. 17**.

Step 3. Click **Play from Start** on the Motion Manager toolbar, **Fig. 17**.

Step 4. Save. Use **Ctrl-S**.

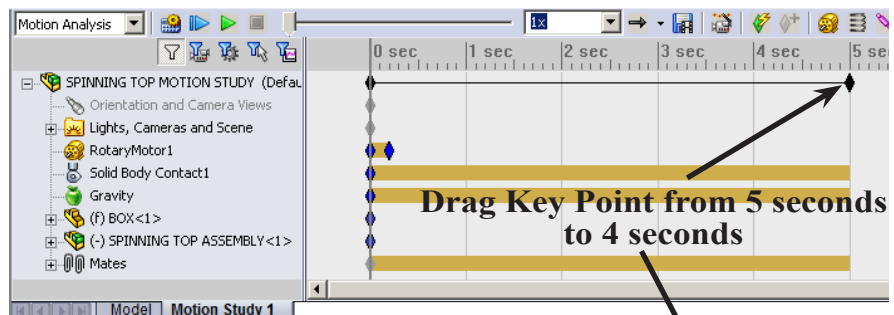


Fig. 16

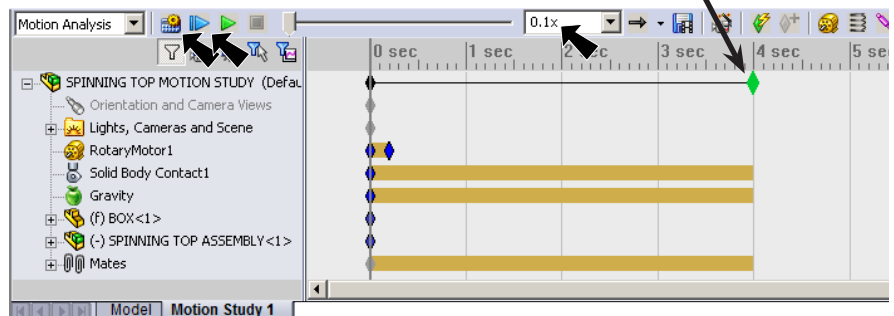


Fig. 17