

Spinning Top Motion Study

A. Enable SOLIDWORKS Motion.

Step 1. If necessary, open your Spinning Top Motion Study Assembly file.

Step 2. If necessary, enable SOLIDWORKS Motion, click the flyout of Options  on the Standard toolbar and click Add-Ins.

Step 3. Check SOLIDWORKS Motion check box under Active Add-Ins and Start-Up, Fig. 1. Click OK.

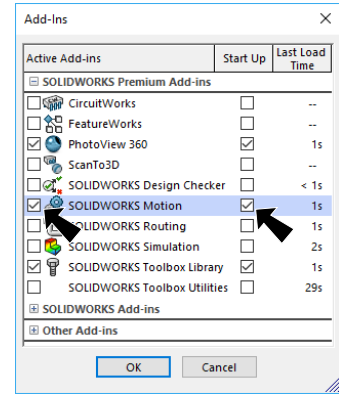


Fig. 1

B. Type of Study.

Step 1. Click Motion Study 1 tab  at the lower left of the graphics area, Fig. 2.

Step 2. Set Type of Study to Motion Analysis, Fig. 2.

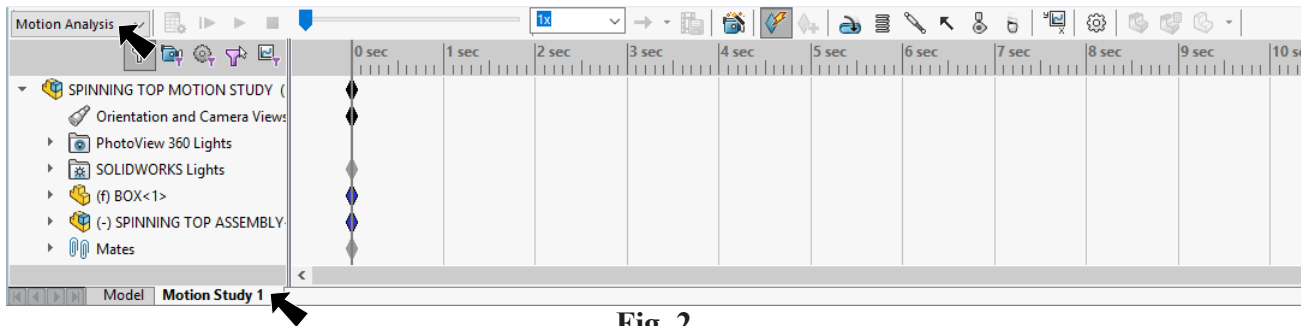


Fig. 2

C. Add Motor.

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

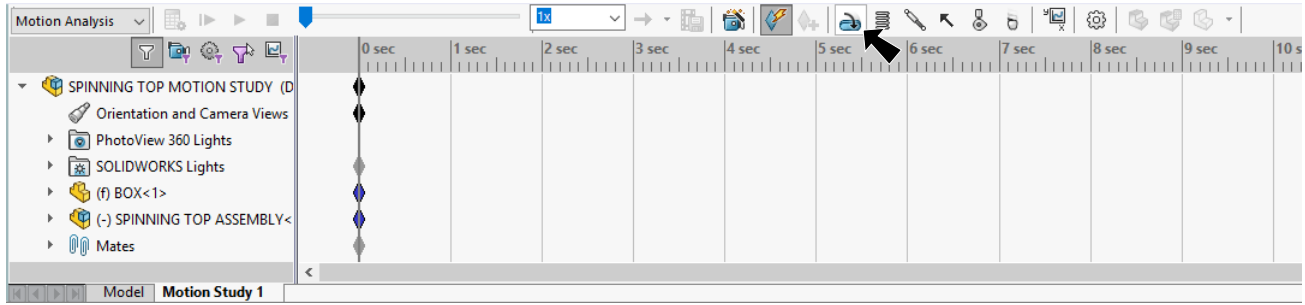




Fig. 3

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**  box, **Fig. 4**
 click **Box**, **Fig. 5**

RPM 500
 click **OK** .

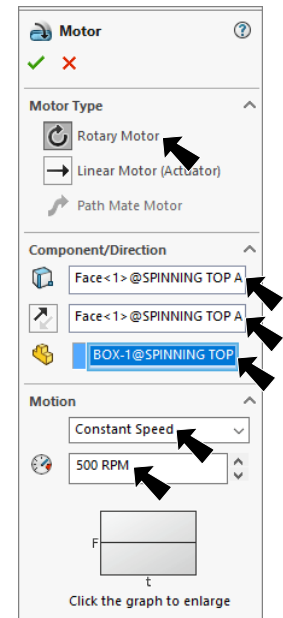


Fig. 4

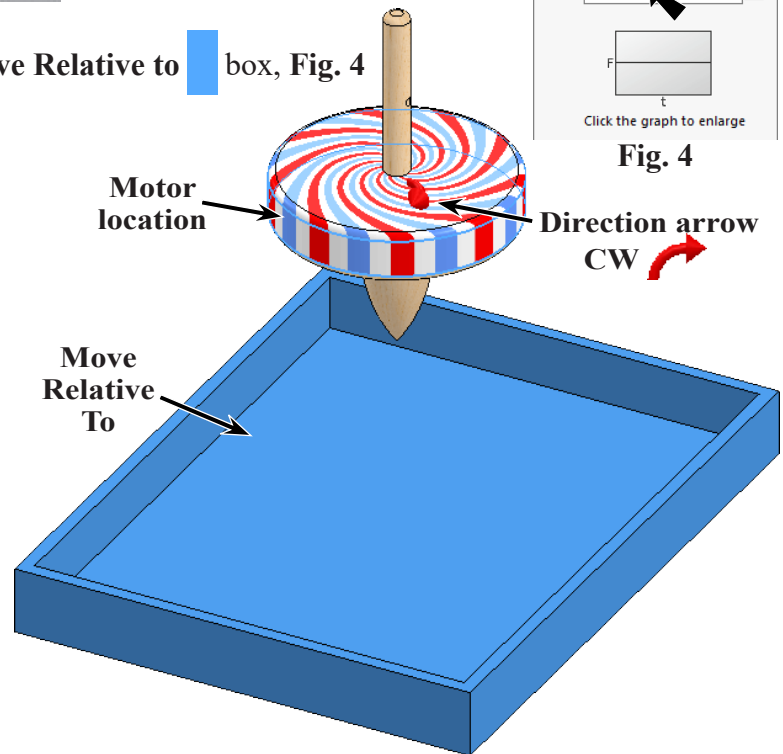


Fig. 5

D. Contact.

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

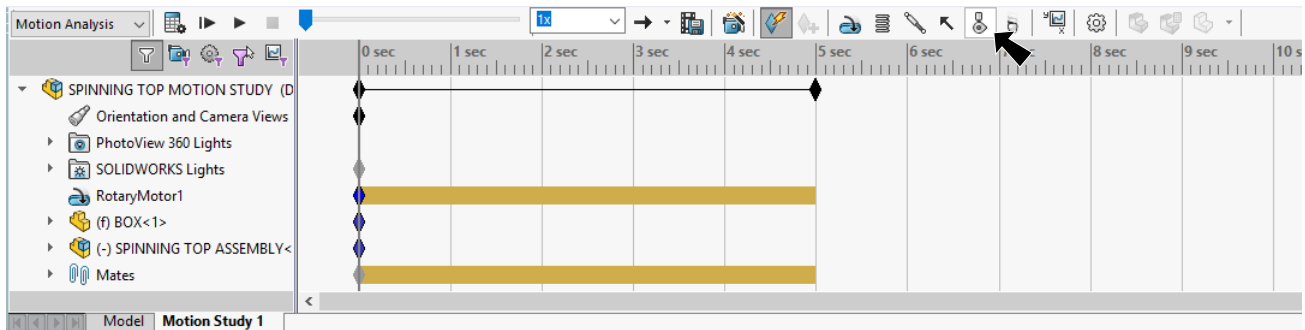



Fig. 6

Step 2. In the Property Manager set:
 expand Selections, **Fig. 7**
 check Use contact groups
 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 μ_k .8

uncheck **Static friction**

click OK .

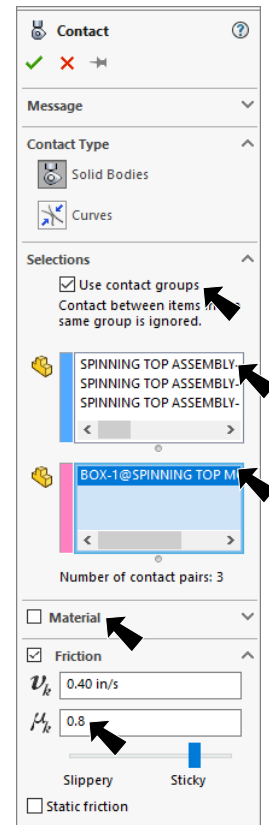


Fig. 7

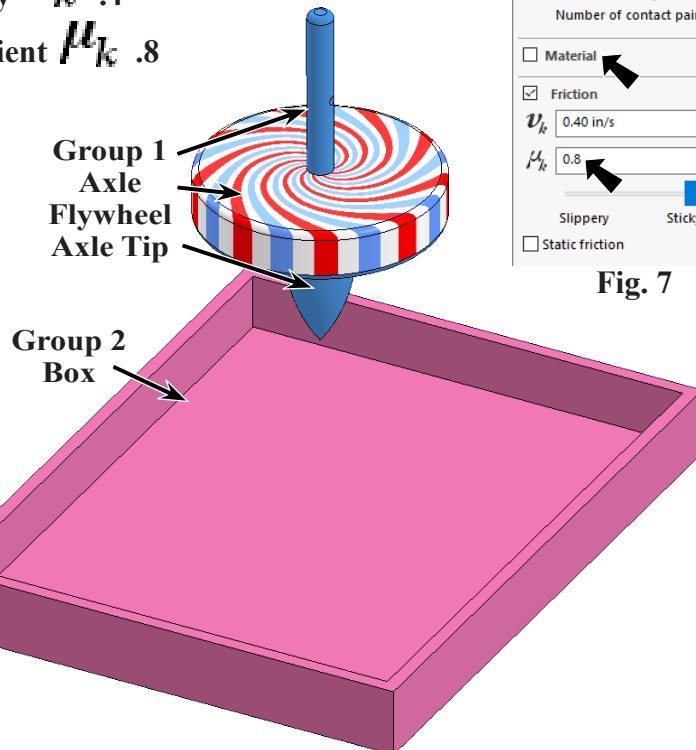


Fig. 8

E. Gravity.

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

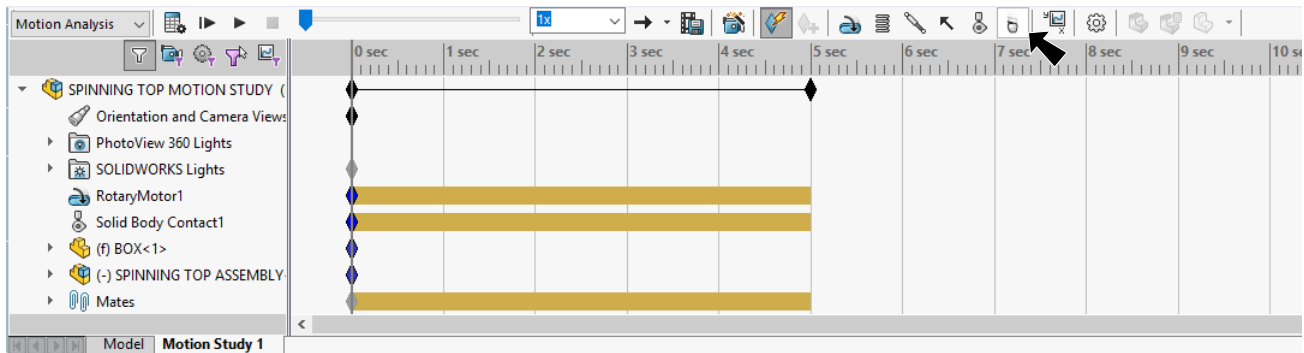



Fig. 9

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**

click **OK**  .

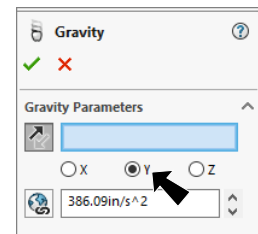


Fig. 10

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

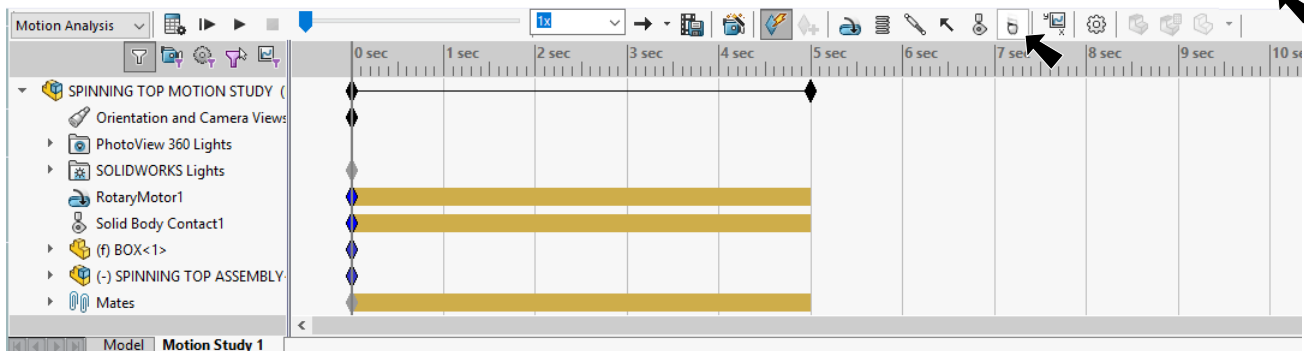


Fig. 11

F. Motion Study Properties.

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

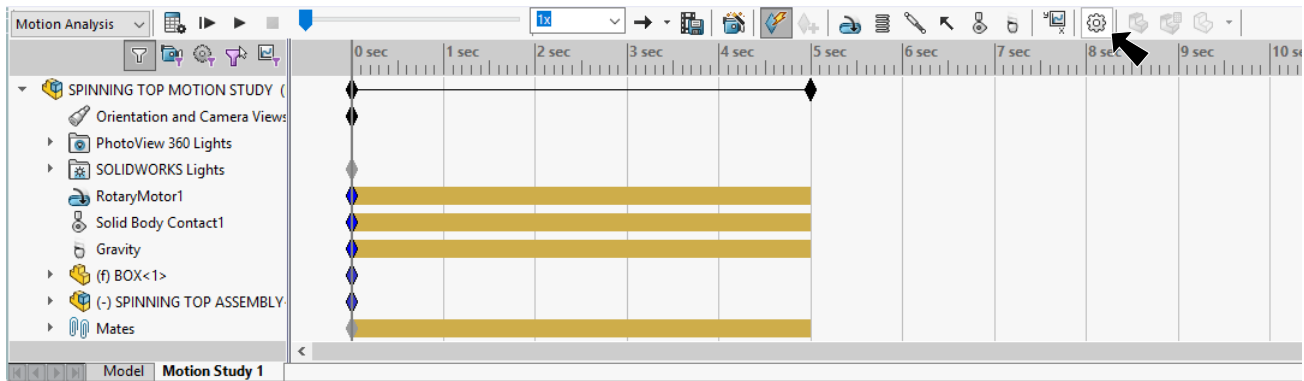



Fig. 12

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

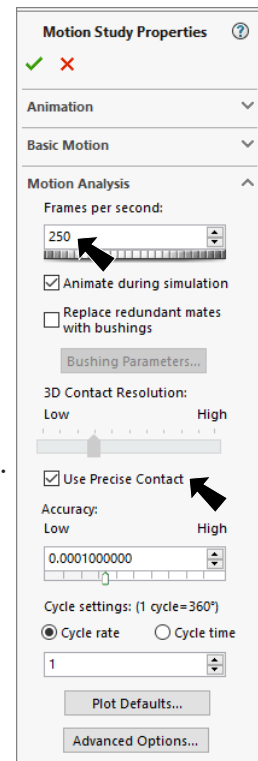


Fig. 13

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**. This adds a key frame at **T = .2**, **Fig. 15**.

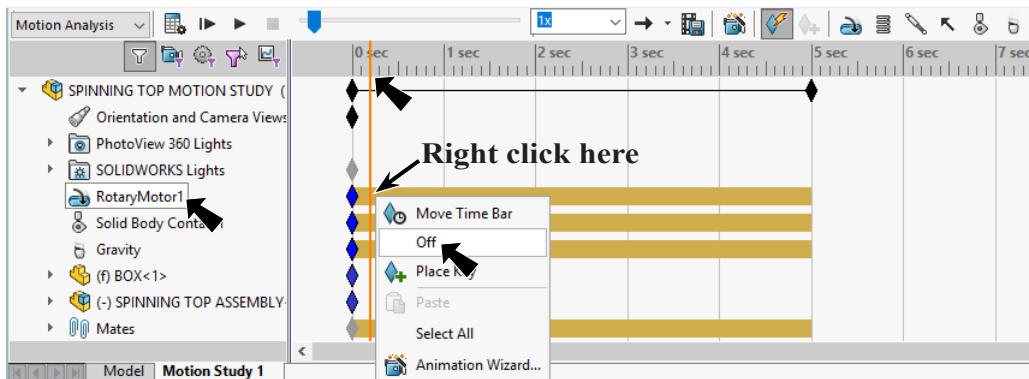


Fig. 14

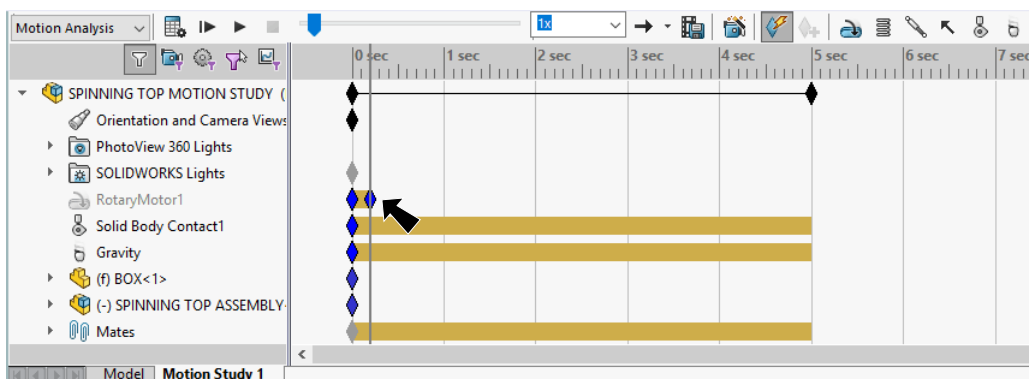


Fig. 15

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. 16**. 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. 16**. Disabling View Keys will allow viewing Motion Study from any view.

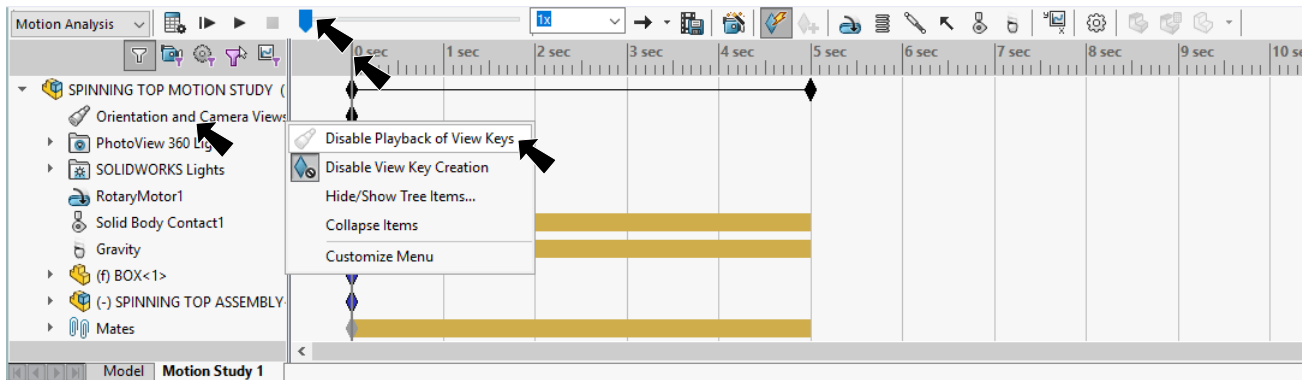


Fig. 16

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. 17**.

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

J. Calculate and Play.

Step 1. Click **Calculate** on the Motion Manager toolbar, **Fig. 18**.

Step 2. Set the **Playback Speed** to **.1**.

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

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

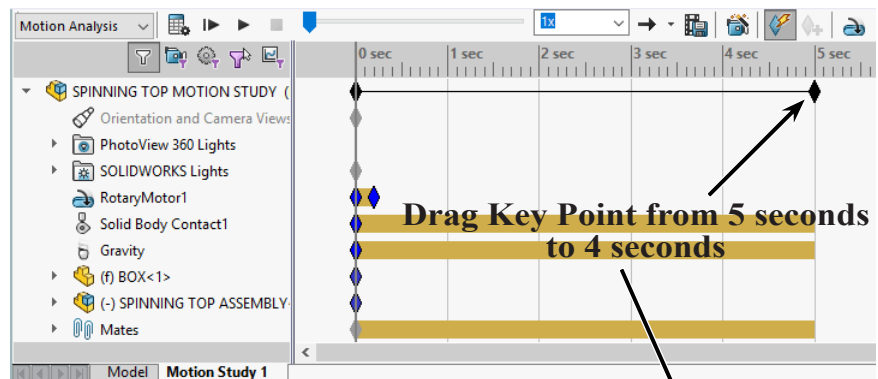


Fig. 17

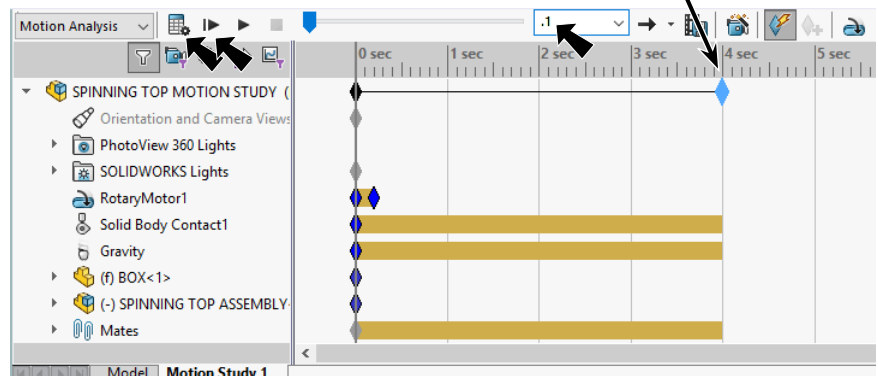


Fig. 18