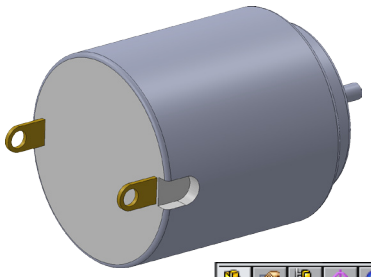
Chapter 7

JSS

Motor



A. Motor.

Step 1. Click File Menu > New, click **Part Metric** and OK.

Step 2. Click **Right Plane** in the Feature Manager and click **Sketch** from the Context toolbar, **Fig. 1**.

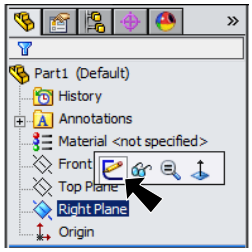


Fig. 1

Step 3. Click **Circle** (**S**) on the Sketch toolbar.

Step 4. Draw **circle** starting at the Origin , **Fig. 2**.

Step 5. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 6. Dimension circle **diameter 23.6, Fig. 2**.

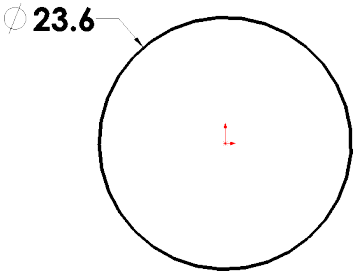


Fig. 2

Step 7. Click **Features** on the Command Manager toolbar.

Step 8. Click **Extruded Boss/Base** on the Features toolbar.

Step 9. In the Boss-Extrude Property Manager set:
under Direction 1, **Fig. 3**

Depth D1 **27**

click OK .

Step 10. Click Zoom to Fit (**F**) on the View toolbar.

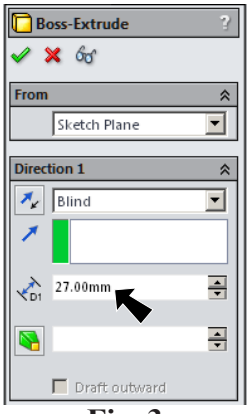


Fig. 3

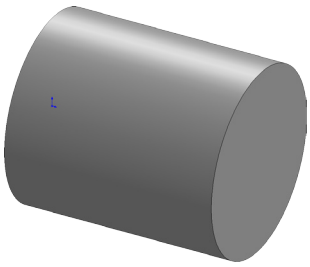


Fig. 4

B. Save as "MOTOR".

Step 1. Click File Menu > Save As.

Step 2. Key-in **MOTOR** for the filename and press ENTER.

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C. Cut.

Step 1. Click **side face** and click **Sketch** on the Context toolbar, **Fig. 5**.

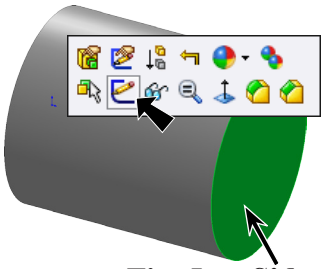


Fig. 5

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Click **Circle** (**S**) on the Sketch toolbar.

Step 4. Draw a circle at the Origin, **Fig. 6**.

Step 5. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 6. Dimension **diameter 19**, **Fig. 6**.

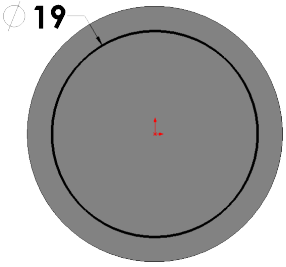


Fig. 6

Step 7. Click **Features** on the Command Manager toolbar.

Step 8. Click **Extruded Cut** on the Features toolbar.

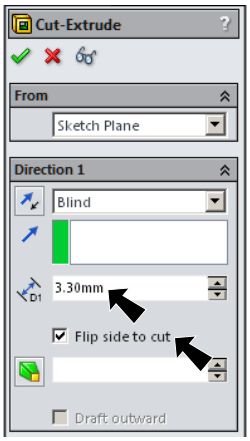


Fig. 7

Step 9. Click **Trimetric** on the Standard Views toolbar.

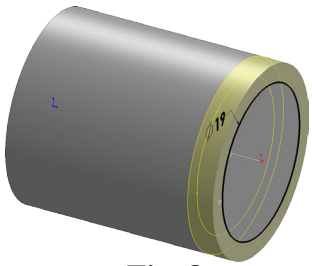


Fig. 8

Step 10. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 7**
Depth **3.3**
check **Flip side to cut**
and click OK.

Step 11. Save. Use **Ctrl-S**.

D. Fillets.

Step 1. Click **Fillet** on the Features toolbar.

Step 2. In the Fillet Property Manager set:
Radius **.5**, **Fig. 9**
click **both cylindrical faces** of Motor, **Fig. 10**
click OK.

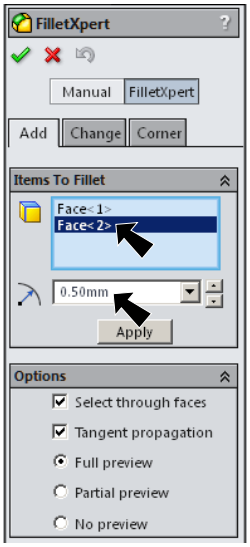


Fig. 9

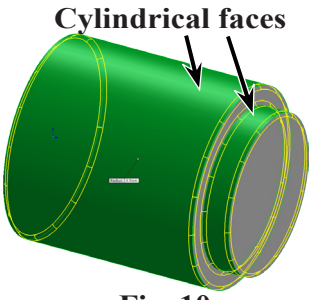


Fig. 10

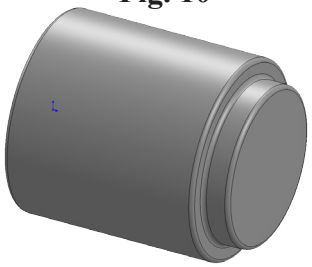


Fig. 11

E. Shaft.

Step 1. Click the **side face** and click **Sketch** on the Context toolbar, **Fig. 12**.

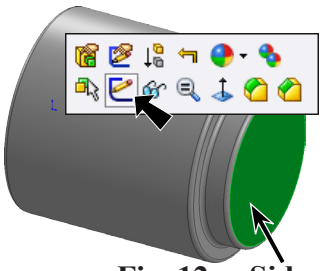


Fig. 12

Step 2. Click **Normal To** on the Views toolbar.

Step 3. Click **Circle** on the Sketch toolbar.

Step 4. Starting at the Origin , draw a circle for the shaft, **Fig. 13**.

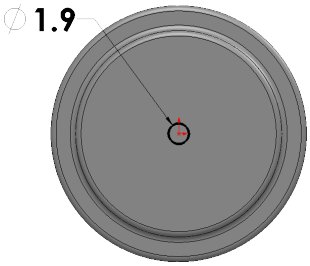


Fig. 13

Step 5. Click **Smart Dimension** **(S)** on the Sketch toolbar.

Step 6. Dimension the circle **diameter 1.9**, **Fig. 13**.

Step 7. Click **Features** on the Command Manager toolbar.

Step 8. Click **Extruded Boss/Base** on the Features toolbar.

Step 9. Click **Trimetric** on the Standard Views toolbar.

Step 10. In the Boss-Extrude Property Manager set:
under Direction 1, **Fig. 14**

Depth D1 **8**

click OK .

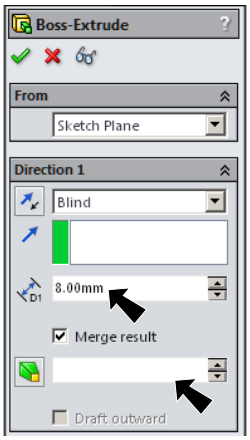


Fig. 14

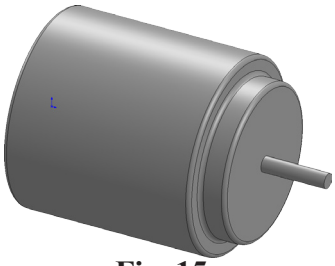


Fig. 15

F. Cut Polarity Slot.

Step 1. Click **Front Plane** in the Feature Manager and click **Sketch** from the Context toolbar, **Fig. 16**.

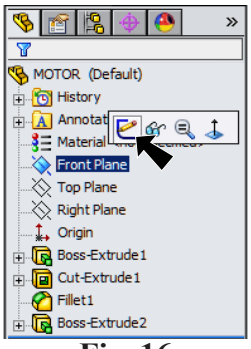


Fig. 16

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Click **Corner Rectangle** (**S**) on the Sketch toolbar.

Step 4. Draw a rectangle **to left of Motor**, **Fig. 17**.

Fig. 17

Step 5. **Right click graphics area and click Select** from menu to unselect Rectangle tool.

Step 6. **Ctrl click** the **left side line of the rectangle** and the **Origin**. Release Ctrl key and click **Make Midpoint** from the Context toolbar, **Fig. 18**.

Step 7. Click **Circle** (**S**) on the Sketch toolbar.

Step 8. Draw **circle from Midpoint** **of right line of rectangle** to coincident to the endpoint of rectangle, **Fig. 19**.

Step 9. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 10. Add dimensions, **Fig. 20**.

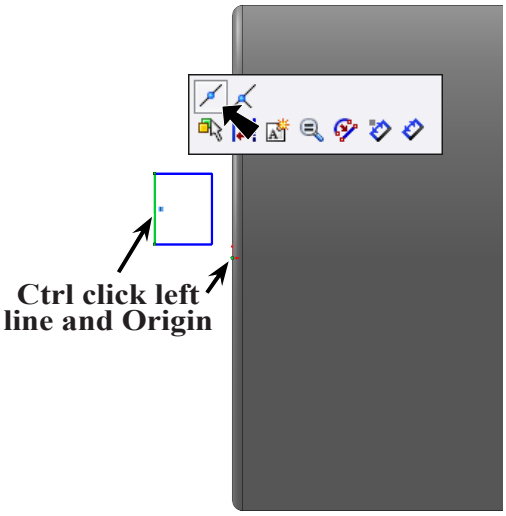


Fig. 18

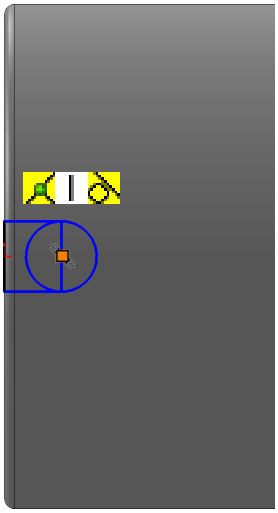


Fig. 19

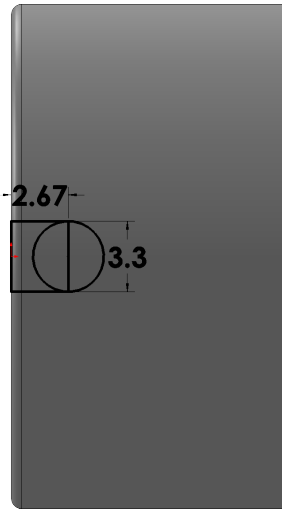


Fig. 20

Step 11. Click **Features**

on the Command Manager toolbar.

Step 12. Click **Extruded Cut**

on the Features toolbar.

Step 13. Rotate view slightly to view **rear of Motor**, **Fig. 22**. Hold the **middle mouse button** (wheel) and rotate view around to view rear.

Step 14. In the Cut Extrude Property Manager set:

under From, **Fig. 21**
Start Condition **Offset**
Offset Value 10.2

under Direction 1
End Condition
Through All

click **Reverse direction**

under Selected Contours
click **all 3 contours**,
Fig. 22

click OK .

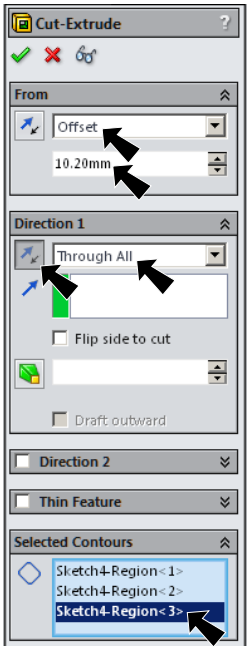


Fig. 21

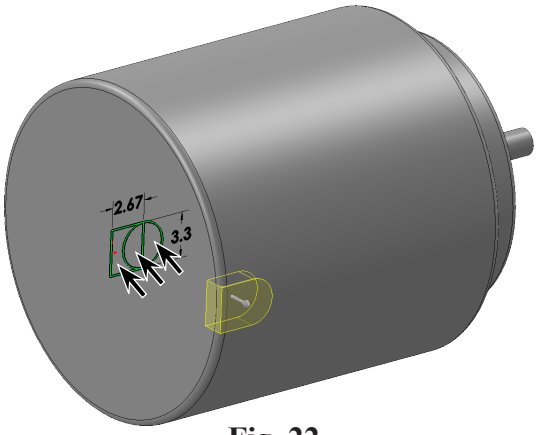


Fig. 22

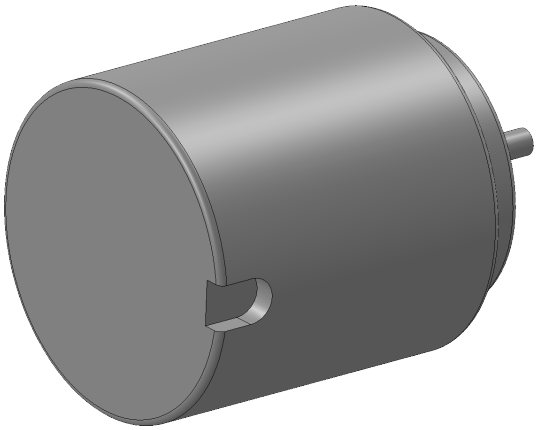


Fig. 23

Step 15. Save. Use **Ctrl-S**.

G. Terminal.

Step 1. Click **Front Plane** in the Feature Manager and click **Sketch** from the Context toolbar, **Fig. 24**.

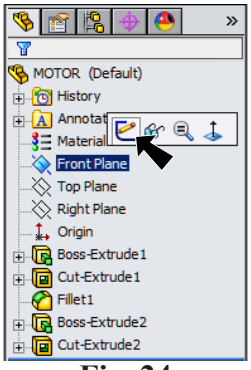


Fig. 24

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Click **Corner Rectangle** (**S**) on the Sketch toolbar.

Step 4. Draw a rectangle **left of Motor**, **Fig. 25**.

Step 5. **Right click graphics area and click Select** from menu to unselect Rectangle tool.

Step 6. **Ctrl click** the **right side line of rectangle** and **Origin**. Release Ctrl key and click **Make Midpoint** from the Context toolbar, **Fig. 26**.

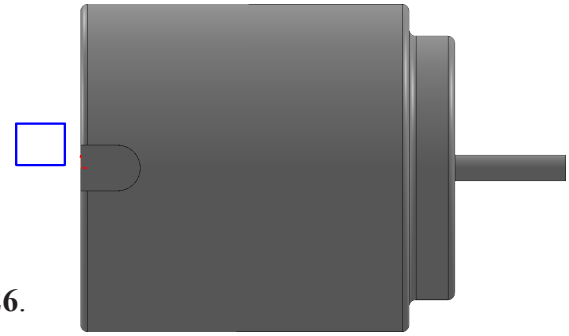


Fig. 25

Step 7. Click **Circle** (**S**) on the Sketch toolbar.

Step 8. Draw **two circles from Midpoint of left line of rectangle**. Draw one circle coincident with the endpoint of rectangle, **Fig. 27**.

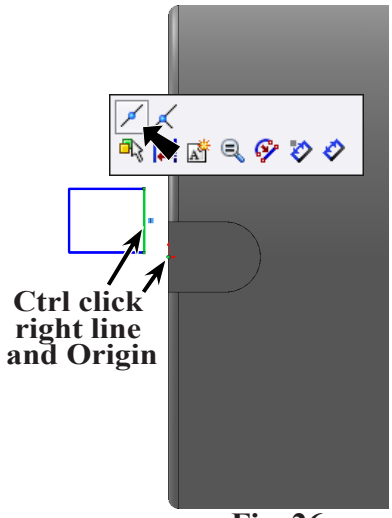


Fig. 26

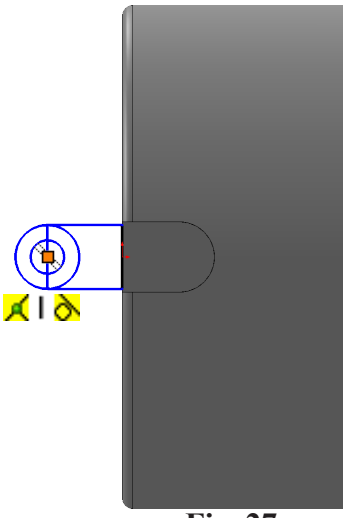
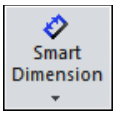


Fig. 27

Step 9. Click **Smart Dimension** 

(S) on the Sketch toolbar.

Step 10. Add dimensions, **Fig. 28**.

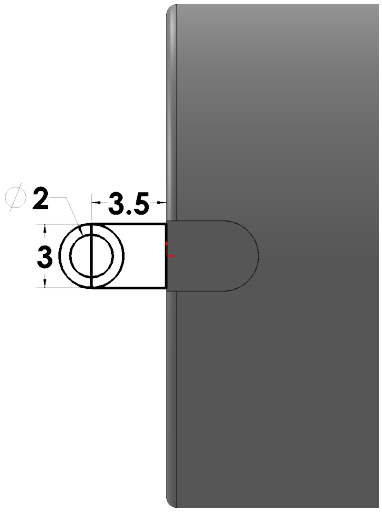


Fig. 28

Step 11. Click **Features**

on the Command Manager toolbar.

Step 12. Click **Extruded Boss/Base**

on the Features toolbar.

Step 13. Rotate view slight to view **rear of Motor**, **Fig. 30**. Hold the **middle mouse button** (wheel) and rotate view around to view rear.

Step 14. In the Boss Extrude Property Manager set:

under From, **Fig. 29**
Start Condition **Offset**
Offset Value 9.4

under Direction 1

Depth **.5**

under Selected Contours
click **both contours between circles** and **contour right of circle**, **Fig. 30**

click OK .

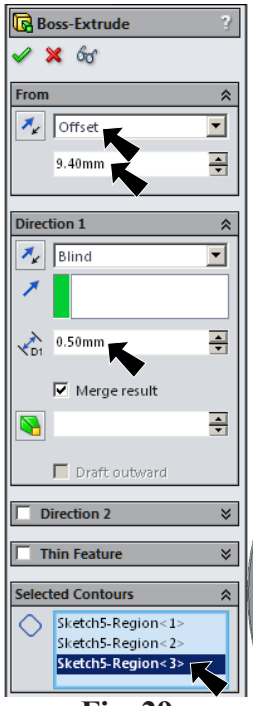


Fig. 29

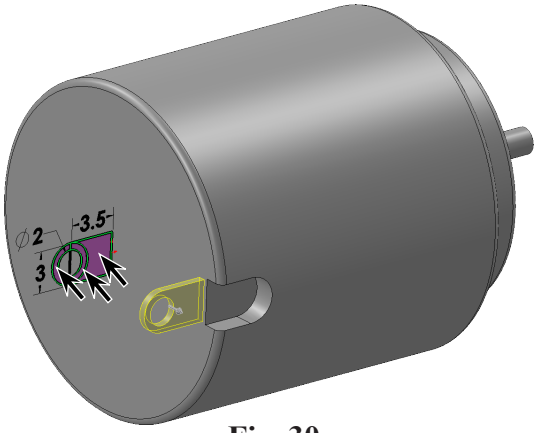


Fig. 30

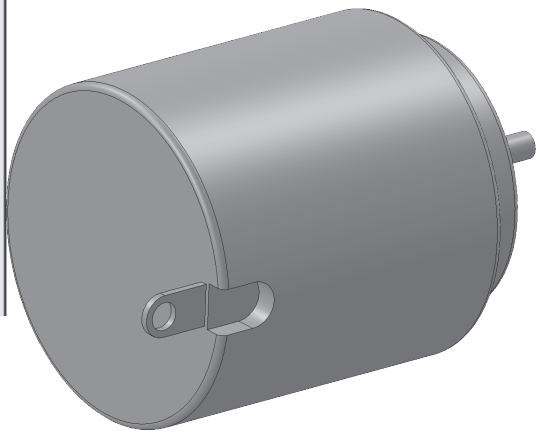


Fig. 31

Step 15. Save. Use **Ctrl-S**.

H. Circular Pattern Terminal.

Step 1. Click **Boss-Extrude3 (Terminal)** feature in the Feature Manager to select, **Fig. 32**.

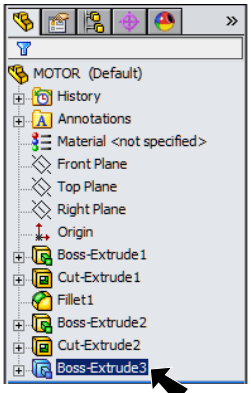
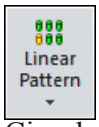


Fig. 32

Step 2. Click **Circular Pattern**

in the **Linear Pattern flyout** 

on the Features toolbar. Click the **flyout arrow** to select Circular Pattern.

Step 3. In the Circular Pattern Property Manager set:

under Parameters, **Fig. 33**

Pattern Axis

click **cylindrical face** of Motor, **Fig. 34**

Angle **360º**

Number of Instances
2

check **Equal spacing**

under Features to Pattern
Boss-Extrude3 feature should be selected

click OK .

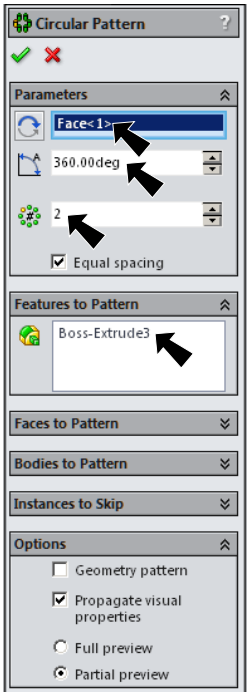


Fig. 33

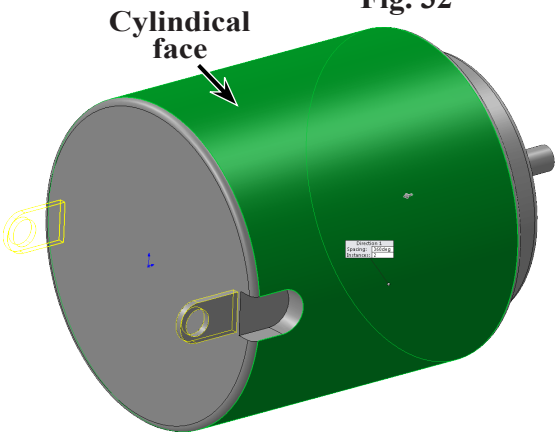


Fig. 34

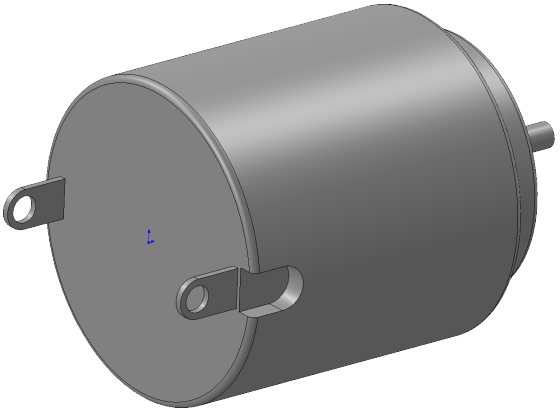


Fig. 35

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

I. Mate Reference 1.

Step 1. Click a **cylindrical edge of a terminal** to select it, **Fig. 36**.

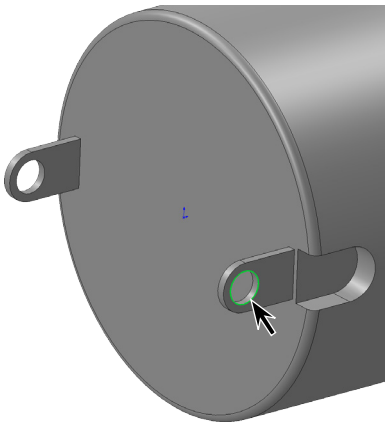


Fig. 36

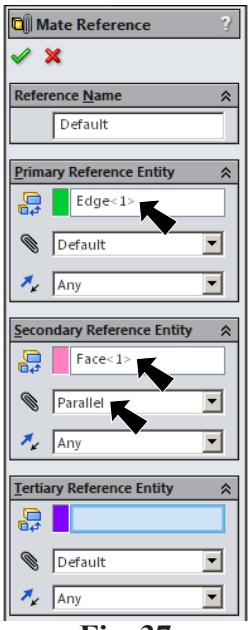
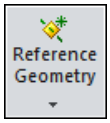


Fig. 37

Step 2. Click **Reference Geometry** 

on the Features toolbar and **Mate Reference** from the menu.

Step 3. In the Mate Reference Manager:

under **Primary** Reference Entity, **Fig. 37** the edge should be selected

under **Secondary** Reference Entity

click in Entity box
and click **top face of terminal**, **Fig. 38**

Mate Reference Type
Parallel

click OK .

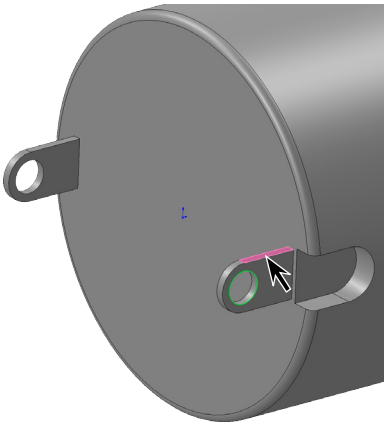


Fig. 38

J. Mate Reference 2.

Step 1. Click **cylindrical edge of the other terminal** to select it, **Fig. 39**.

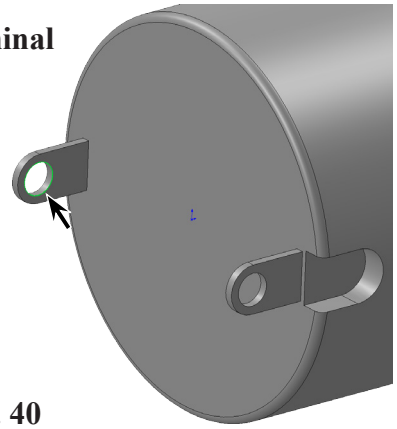


Fig. 39

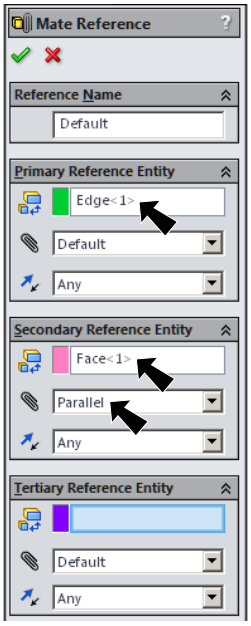
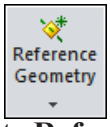


Fig. 40

Step 2. Click **Reference Geometry** 

on the Features toolbar and **Mate Reference** from the menu.

Step 3. In the Mate Reference Manager:

under **Primary** Reference Entity, **Fig. 40** the edge should be selected

under **Secondary** Reference Entity

click in Entity box
and click **top face of terminal**, **Fig. 41**

Mate Reference Type
Parallel

click OK .

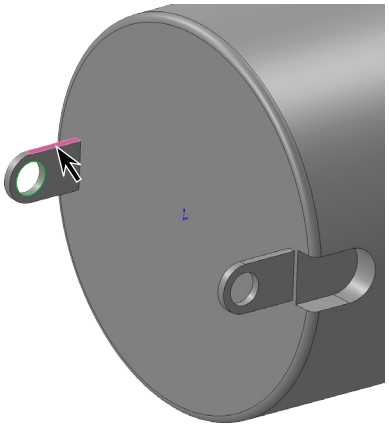


Fig. 41

K. Material Chrome Stainless.

Step 1. **Right click Material** in the Feature Manager and click **Edit Material**, **Fig. 42**.

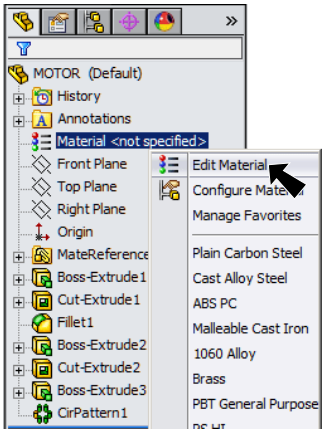


Fig. 42

Step 2. Expand **Steel** in the material tree and click **Chrome Stainless Steel**. Click **Apply** and **Close**.

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

L. Appearance.

Step 1. Click the Motor to select the part, click **Appearances Callout** on the Context toolbar and click **Motor**, **Fig. 43**.

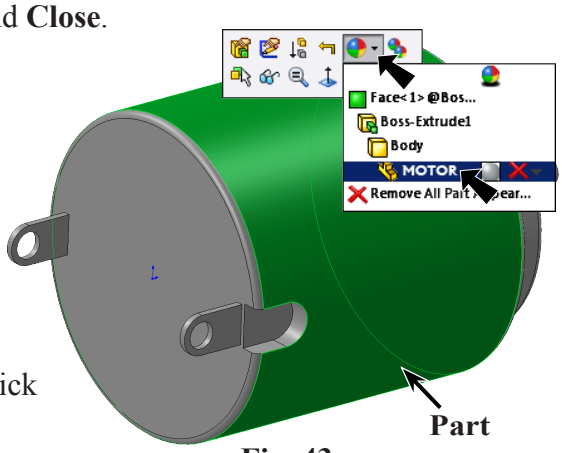


Fig. 43

Step 2. In the Appearances Property Manager:
under Selected Geometry, **Fig. 44**
click **Remove Appearance**

under Color:
set **RGB values:**
R 202
G 209
B 222

click **Keep Visible** and OK , **Fig. 44**. The Push Pin on allows selection of another appearance.

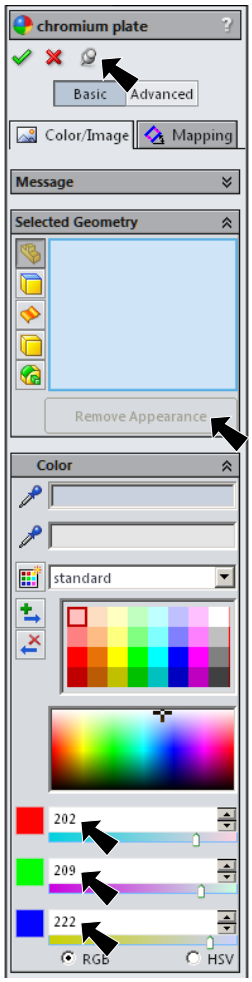


Fig. 44

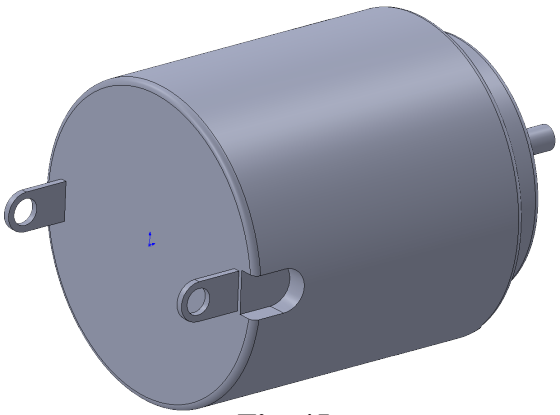


Fig. 45

Step 3. Over at the Task pane, click the Appearances Task tab , expand **Plastic**, click **High Gloss** and in the lower pane select **white high gloss plastic**, **Fig. 46**.

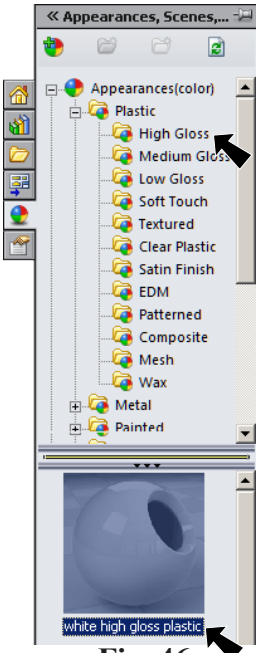


Fig. 46

Step 4. In the Appearances Property Manager, under Selected Geometry

click **Select Faces** , **Fig. 47**

click **rear face of Motor**, **Fig. 48**

click **Select Features** , **Fig. 49**

click **Polarity slot** (Cut-Exturde-1), **Fig. 50**

click OK .

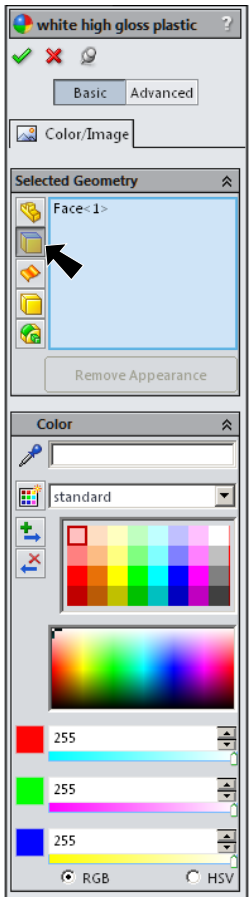


Fig. 47

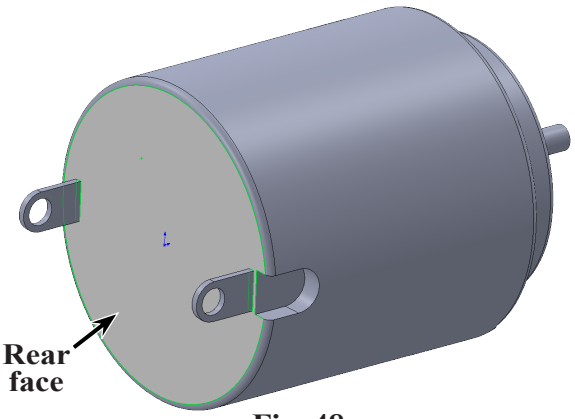


Fig. 48

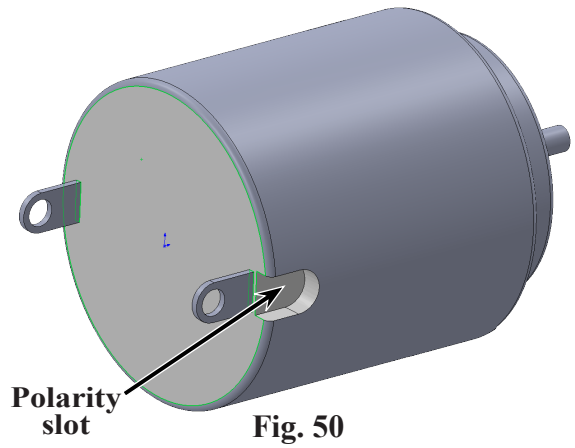


Fig. 50

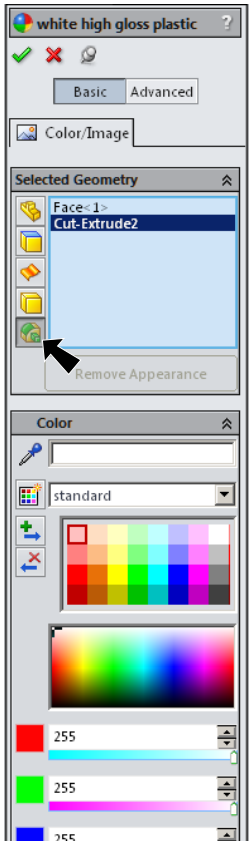


Fig. 49

Step 5. Back over at the Task pane, click the Appearances Task tab , expand **Metal**, click **Brass** and in the lower pane select **polished brass**, **Fig. 51**.

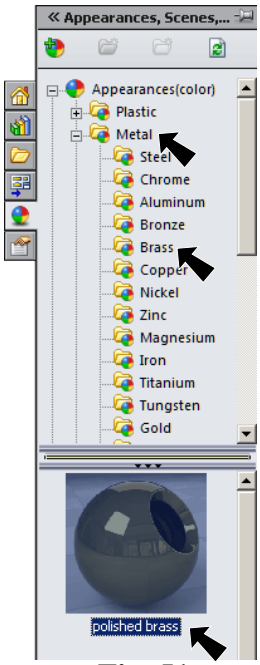


Fig. 51

Step 6. In the Appearances Property Manager, under Selected Geometry

Select Features should still be selected, **Fig. 52**

click **both terminals**, **Fig. 53**

click OK and then click Cancel .

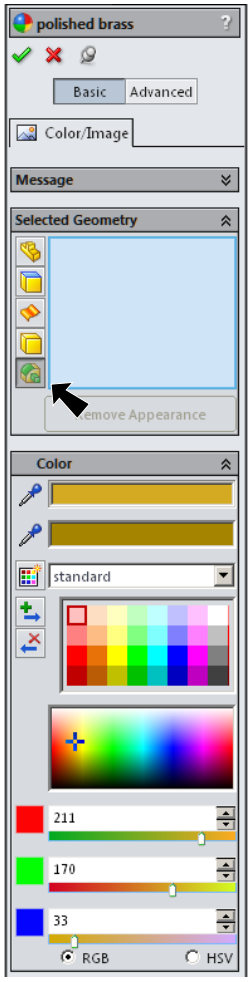


Fig. 52

Step 7. Save. Use **Ctrl-S**.

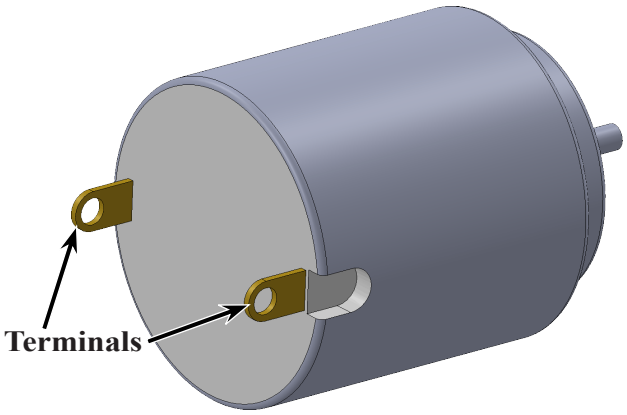


Fig. 53