

# Magnet selection

TI Precision Labs – TI Magnetic Sense Simulator

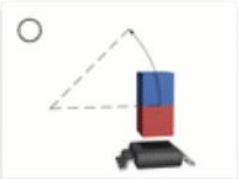
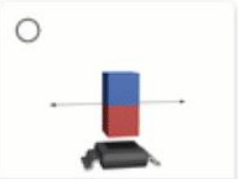
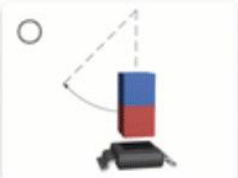


Presented and prepared by Patrick Simmons

# Starting a design – magnet shape







TI Magnetic Sense Simulator (TIMSS) Patrick

1 Function & Magnet    2 Select Sensor    3 Preview Window

### 1. Select Function

-  **Hinge**
-  **Linear**
-  **Joystick**
-  **Rotation**
-  **Static Position**

### 2. Select Magnet Shape

-  **Bar**  
Pole Count:  $\geq 2$   
Commonly used in:  
Laptop lid closure  
Limit detection
-  **Diametric Cylinder**  
Pole Count: Only 2  
Commonly used in:  
Angle Measurements  
End of Shaft Motor speed
-  **Axial Cylinder**  
Pole Count: Only 2  
Commonly used in:  
Trigger detection  
Joystick
-  **Ring**  
Pole Count:  $\geq 2$   
Commonly used in:  
Angle Measurements  
On Shaft motor speed
-  **Axial Ring**  
Pole Count:  $\geq 2$   
Commonly used in:  
Angular Incremental Encoding
-  **Sphere**  
Pole Count: Only 2  
Spherical magnet's field contour is closest to an ideal magnetic dipole

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# Adjusting magnet selection

The screenshot displays the TI Magnetic Sense Simulator (TIMSS) interface. The main workspace shows a 3D model of a magnet, which is a cylinder with a red top half and a blue bottom half, positioned on a grid. The interface includes a top navigation bar with the title "TI Magnetic Sense Simulator (TIMSS)" and a user profile "Patrick". Below the title bar, there are tabs for "Edit Design" and "Output". On the left side, there are icons for "Design", "Parametric Sweep", and "Compare Design". On the right side, there are tabs for "Magnet", "Sensor", and "Sim Settings". The "Magnet" tab is active, showing the "Magnet Specifications" section. The settings are as follows:

Magnet Specifications	
Magnet Shape	Axial Cylinder
Poles	2
Magnet Material	Sintered Neodymium Ir...
Material Grade	N35
Select Remanence Value	Average Remanenc...
Remanence (Br)	Temperature
1200 mT at 20°C	20 °C
Temperature Coefficient	Coercivity
-0.12 %/°C	10.9 KOe

Below the specifications, there are sections for "Magnet Geometry" and "Magnet Motion". A red "Simulate" button is located at the bottom center of the workspace.

# Variables that influence measurable flux

The screenshot displays the TI Magnetic Sense Simulator (TIMSS) interface. The main workspace shows a 3D model of a magnet, which is a cylinder with a red top half and a blue bottom half, positioned on a grid. The interface includes a top navigation bar with the title "TI Magnetic Sense Simulator (TIMSS)" and a user profile "Patrick". On the left, there are tabs for "Edit Design" and "Output", along with icons for "Design", "Parametric Sweep", and "Compare Design". On the right, there are tabs for "Magnet", "Sensor", and "Sim Settings". The "Magnet" tab is active, showing "Magnet Specifications" with the following parameters:

Magnet Specifications	
Magnet Shape	Axial Cylinder
Poles	2
Magnet Material	Sintered Neodymium Ir...
Material Grade	N35
Select Remanence Value	Average Remanenc...
Remanence (Br)	Temperature
1200 mT at 20°C	20 °C
Temperature Coefficient	Coercivity
-0.12 %/°C	10.9 KOe

Below the specifications, there are expandable sections for "Magnet Geometry" and "Magnet Motion". A red "Simulate" button is located at the bottom center of the workspace.

# Magnet classes

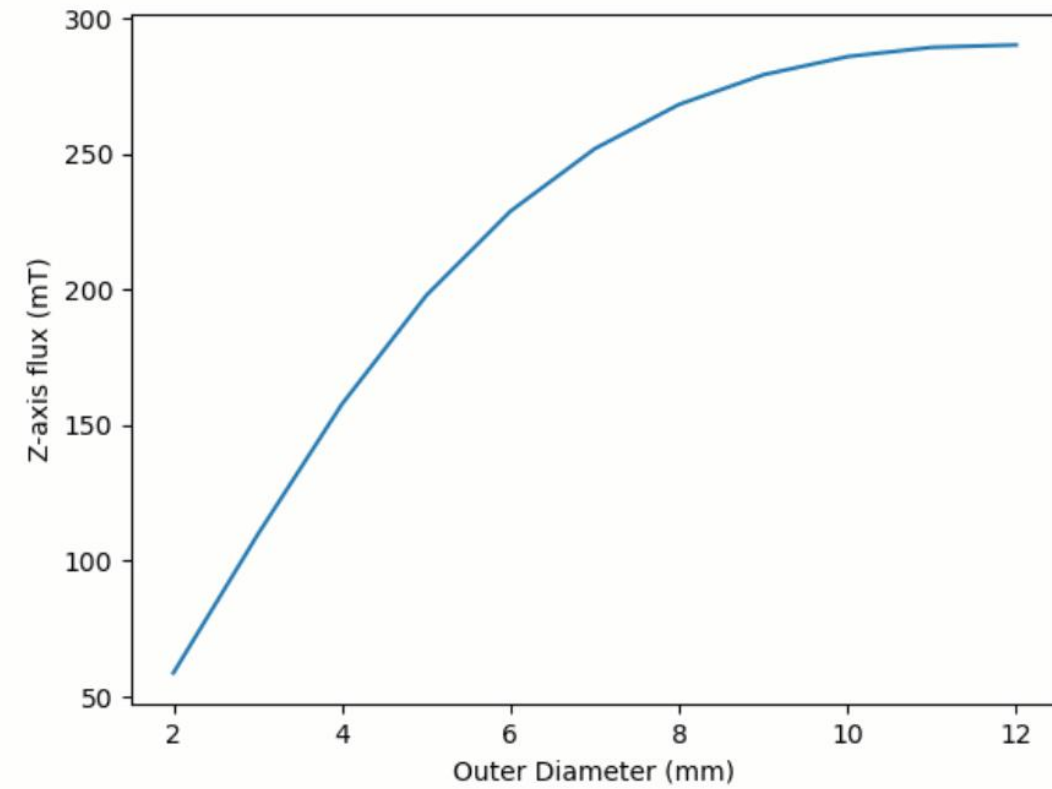
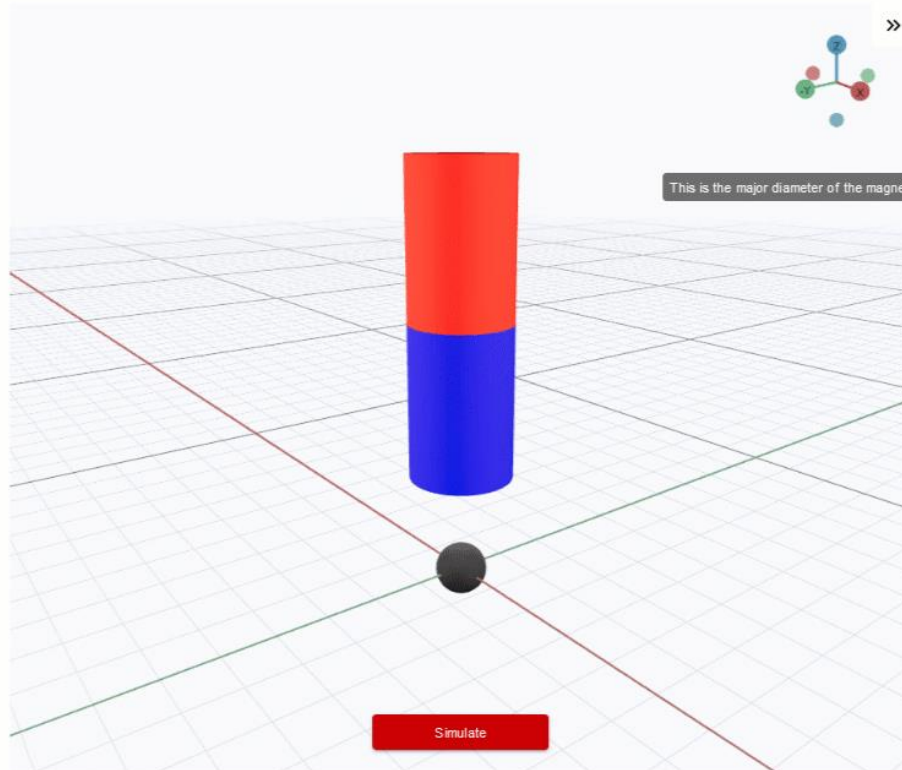
The screenshot displays the TI Magnetic Sense Simulator (TIMSS) interface. The main workspace shows a 3D model of a magnet, which is a cylinder with a red top half and a blue bottom half, positioned on a grid. A coordinate system with X, Y, and Z axes is visible in the upper right of the workspace. The interface includes a top navigation bar with the title "TI Magnetic Sense Simulator (TIMSS)" and a user profile "Patrick". Below the title bar, there are tabs for "Edit Design" and "Output", and a "Design" sidebar with icons for "Design", "Parametric Sweep", and "Compare Design". The right-hand side of the interface features a settings panel with tabs for "Magnet", "Sensor", and "Sim Settings". The "Magnet" tab is active, showing "Magnet Specifications" with the following settings:

- Magnet Shape: Axial Cylinder
- Poles: 2
- Magnet Material: Sintered Neodymium I...
- Material Grade: N35

Select Remanence Value		Average Remanence ...	
Remanence (Br)	Temperature		
1200 mT at 20°C	20 °C		
Temperature Coefficient	Coercivity		
-0.12 %/°C	10.9 KOe		

Below the specifications, there are expandable sections for "Magnet Geometry" and "Magnet Motion". A red "Simulate" button is located at the bottom center of the workspace.

# Impact of size on flux



\*Exact values subject to design

# Impact of magnet position relative to sensor

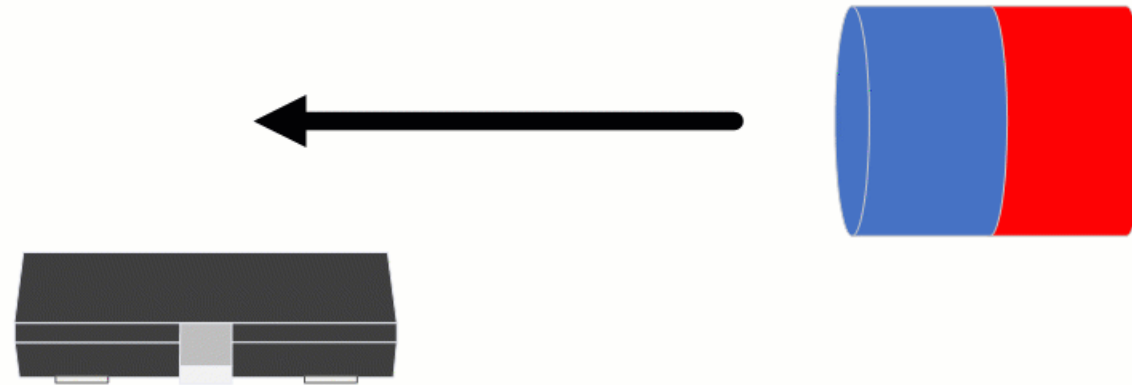
The image displays a 3D simulation environment with a grid floor. A cylindrical magnet, colored red on top and blue on the bottom, is positioned vertically at the origin (0, 0, 0). Below it, a small black sphere representing a sensor is positioned at (10, 0, 0). A red button labeled "Simulate" is located at the bottom center of the grid. To the right of the 3D view is a settings panel with three tabs: "Magnet", "Sensor", and "Sim Settings". The "Magnet" tab is active, showing a tree view with "Magnet Specifications", "Magnet Geometry", and "Magnet Motion". Under "Magnet Motion", there are sections for "Origin Position" and "Final Position".

Origin Position		
Position		
X Axis	Y Axis	Z Axis
0 mm	0 mm	0 mm
Angle		
X Axis	Y Axis	Z Axis
0 Deg	0 Deg	0 Deg

Final Position		
Position		
X Axis	Y Axis	Z Axis
10 mm	0 mm	0 mm

# Flux example





# Learn more

- TI Magnetic Sense Simulator Product Folder  
<https://www.ti.com/TIMSS>
- TI Magnetic Sense Simulator User's Guide  
<https://www.ti.com/lit/ug/slyu067/slyu067.pdf>
- TI Magnetic Sense Simulator App Brief  
<https://www.ti.com/lit/ab/slya083/slya083.pdf>
- Position Sensing Demo Video Series  
<https://www.ti.com/video/series/position-sensing-demos.html>
- TI Precision Labs: Magnetic Sensor Training Videos  
<https://www.ti.com/video/series/precision-labs/ti-precision-labs-magnetic-sensors.html>
- Sensors E2E Forum  
<https://e2e.ti.com/support/sensors-group/sensors/f/sensors-forum>
- TI Magnetic Sensor Portfolio  
<https://www.ti.com/magneticsensors>

To start your simulation now, visit:  
[webench.ti.com/timss/](http://webench.ti.com/timss/)



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