

ANSYS Forces in Permanent Magnets - Case Setup

Author(s): Joshua Wallace & Steve Scampoli, ANSYS Inc.

Problem Specification

1. Pre-Analysis & Start-Up
2. Geometry
3. Physics Setup
4. Case Setup
5. Solution/Results

Case Setup

Setting up case 1:

The last parameter we need to define is the force on the magnet. [Go to Results in the workflow.](#) Under **Objects**, click on **Results** again. Select **Value Force Magnitude 1**. Click on the arrow horizontal from undefined and select parametrize.

Value Force Magnitude 1

Out-of-date

▼ Definition

Method
Function calculator

Location
Force Computation 1

Function
Value

Variable
> Force.mag

Value
Undefined

Evaluate Next Step

> Related Objects and Tasks

Click on the **Design Points dashboard** in the upper right hand corner.



The first table that comes up is the design points. Under **Current 1 Operating current**, iterate the input by 10 mA up to 100mA. Use the image below for reference. In the other column, input 0.254mm for the horizontal(R) distance. Once this is done, click **Update All** in the top right corner of the design points dashboard. AIM will solve each case for the force on the magnet and the force outputs for each current input can be seen in the design points dashboard.

P1 - Modeling Import Source 1 ... m ▾	P3 - Current 1 Operating current mA ▾	P2 - Calculated Value 1 Value N ▾
0.000254	10	0.00096053
0.000254	20	0.0025759
0.000254	30	0.004834
0.000254	40	0.0071418
0.000254	50	0.009473
0.000254	60	0.012033
0.000254	70	0.013324
0.000254	80	0.012727
0.000254	90	0.015052
0.000254	100	0.017378

Setting up case 2:

In case two, the force of the magnetic is a function of horizontal(R) distance. In the design parameters dashpoint, [change all the current data points to 50mA](#). Then iterate the horizontal data points from 0.05mm-.5mm by 0.05mm. Click update all to see results.

P1 - Modeling Import Source 1 ... m ▾	P3 - Current 1 Operating current A ▾	P2 - Calculated Value 1 Value N ▾
5E-05	0.05	0.0041462
0.0001	0.05	0.0074145
0.00015	0.05	0.0027368
0.0002	0.05	0.0084696
0.00025	0.05	0.0079015
0.0003	0.05	0.00839
0.00035	0.05	0.0092461
0.0004	0.05	0.010138
0.00045	0.05	0.009001
0.0005	0.05	0.0085329

[Go to Step 5: Solution/Results](#)

[Go to all ANSYS AIM Learning Modules](#)