

# ANSYS Forces in Permanent Magnets - Case Setup

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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Out-of-date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](#)