SPEED: Software for Electric Machine Design and Analysis

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What is SPEED?

-The leading design software for electric machines
-Detailed analysis with finite-element links or finite-embedded solver for
  - Motors, Generators and Alternators
  - including inverters and other electronic controls

Application areas (main)
- Automotive including electric & hybrid vehicles
- Aerospace
- Industrial and automation
- Domestic appliances
- Power tools
- Medical systems

Over 150 corporate accounts
- Over 1500 users
- A Worldwide Distributors Network including support
- Operating in all industrialized countries
What is SPEED?

*SPEED brings authority in electrical machine theory and design*
- based on a vast range of applications in real product design
- much more than just a calculator

*Not just software, but as well as*
- Training,
- Technical support,
- Documentation (manuals, tutorials and electrical machine theory books)
- Engineering services and
- Consulting through the distributors
Electric machine calculations: In general
Electric machine calculations using SPEED: not to replace the designer but provide a fast calculation tool to try ideas.
The SPEED Software

- Analytical based so gives near instantaneous calculation speeds
  - input dimensions, select materials and drive and calculate performance
    - Initial Design – 10 Minutes
    - Optimized Design – within hours

- Specialised user interface to ease data input and interpretation of results
  - dedicated geometry and winding editors
  - produces performance graphs to aid understanding

- Detailed analysis with finite-element links or
  - The embedded finite-element solver for key problems
The following machine types are available:

- brushless permanent magnet and wound-field AC synchronous
  - PC-BDC
- induction
  - PC-IMD
- switched reluctance
  - PC-SRD
- direct current (PM)
  - PC-DCM
- wound field and PM commutator
  - PC-WFC
1986 – Speed Laboratory set up
1987 – PC-SRD released (DOS)
1989 – PC-BDC released (DOS)
1992 – PC-DCM released (DOS)
1994 – PC-IMD released (DOS)

...  
2000 – Release of full Windows versions

...  
2004 – PC-WFC released

...  
2011 – CD-adapco acquired SPEED in June 2011

– PC-SRD 8.8, – PC-BDC 9.1
– PC-IMD 4.1, – PC-DCM 3.9 and
– PC-WFC 2.6

... Continuing development ...
SPEED PC-BDC machine types
more than 40 basic standard templates

Examples
- SurfRad
- SurfPlI
- BreadLoaf
- Spoke
- ExtRad
- ExtPlI
- IPM
- InsCP
- InsRel
- FullRing
- WoundFld
- LSIPM
- Trapeze
SPEED PC-IMD machine types
more than 40 basic standard templates
SPEED PC-SRD machine types

Examples
- A little 3-phase motor
- A little 4-phase motor
- A 3-phase 12/8 motor
- An outside-rotor motor
- A stepped-gap 6/2 motor
SPEED PC-DCM machine types
SPEED PC-WFC machine types

Examples
- WF Square 2 pole
- WF Round 2 pole
- WF Round 4 pole
- WF Square 4 pole
- WF Square 6 pole
- WF DimGroup=dg1 2 pole
- PM Arc magnet

Drive/Connex
- AC series
- DC series
- DC shunt
- DC sep ex
SPEED in use: Define the geometry The outline editor
SPEED in use: Select material from the material database

![Material selection dialog box](image)
SPEED in use: Definition of the material using the Data Base Manager programs
SPEED in use: Definition of the winding – The winding editor
SPEED in use: The Template editor – input data for calculation options, temperature, control parameters, etc.
SPEED in use: Graphical Output – graphical feedback available
**SPEED in use: Output design sheet – large range of numerical values available**

### Dynamic design (time-stepping simulation):

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<th>Vs</th>
<th>RPM</th>
<th>400.0000 rpm</th>
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SPEED in use: GoFER

Go to Finite-Elements and Return

... or use the embedded FE-solver directly (PC-BDC only)
ActiveX links allows automated linkage to other software packages such as Visual Basic, Matlab, Motor-CAD and more...