

MANATEE® SOFTWARE INSTALLATION GUIDE

Magnetic Noise Acoustic Analysis Tool for Electrical Engineering

VERSIONING

Rev.	Date	Author	Checker	Approver	Description
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1 INTRODUCTION

Welcome to the MANATEE® Installation Guide, which provides instructions on how to install MANATEE (Magnetic Acoustic Noise Analysis Tool for Electrical Engineering) software version 1.05.03 and further.

1.1 System requirements

MANATEE requires some hardware and software specifications as listed below:

- Operating System: Windows 32/64bits (Vista, Seven, 8)
- Matlab® 2009 or later without specific toolbox
- FEMM 4.2 [R2] for Finite Element Method electromagnetic simulations (if the licence includes EM3.SCIM or EM3.PMSM module)
- RAM up to 6 Gb (for slot numbers up to 200) for Finite Element Method structural calculations with GetDP

1.2 Previous installation

If you use the default path, the installer should create a folder for each MANATEE version (C:\MANATEE\1_05_03). Once the installation is complete, copy / paste all your former data (simulation projects scripts (from /Projects/MyProjects), your machine data scripts (from /MachineData/MyMachines folder), your post-process (/PostProcessing/MyPost) and eventually your former results (from /Results)) from one version folder to another.

You should not use simultaneously two versions of MANATEE in the same Matlab session (See Matlab Path section).

1.3 License agreement

For the complete software license agreement with details on the license conditions, please refer to the MANATEE Software License Agreement [R1].

2 REFERENCES AND ABBREVIATIONS

2.1 References

Ref.	Title
[R1]	IT_0006_D_EN EOMYS ENGINEERING software licence agreement
[R2]	http://www.femm.info/wiki/License
[R3]	http://www.mathworks.com/matlabcentral/answers/95039
[R4]	http://www.mathworks.com/matlabcentral/answers/101105
[R5]	http://eomys.com/produits/manatee/article/logiciel-manatee?lang=en

2.2 Abbreviations

EM3.SCIM	Electromagnetic finite element module for squirrel cage induction machines.
EM3.PMSM	Electromagnetic finite element module for rotor surface, buried or inset permanent magnet synchronous machines.

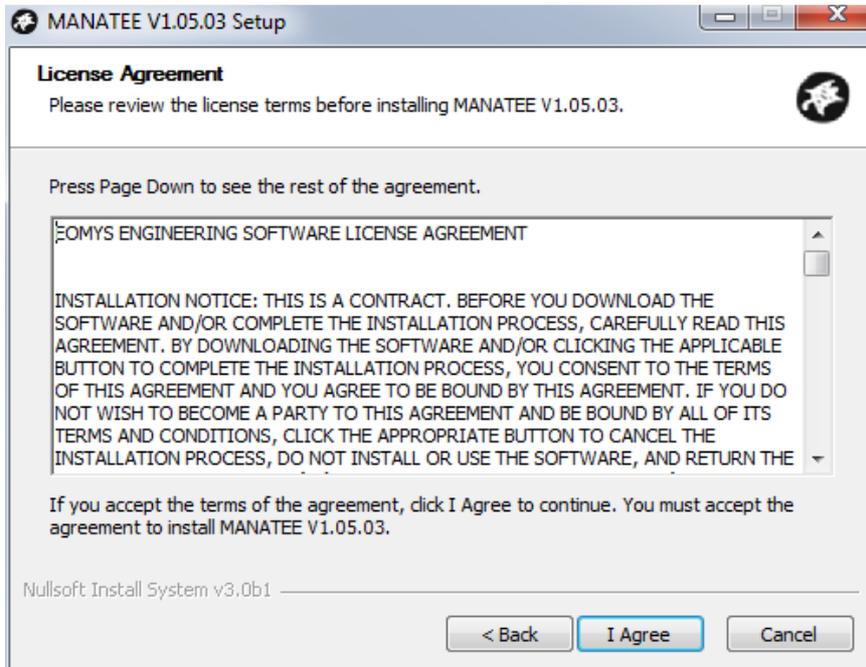
3 INSTALLATION

3.1 Running the MANATEE Installer

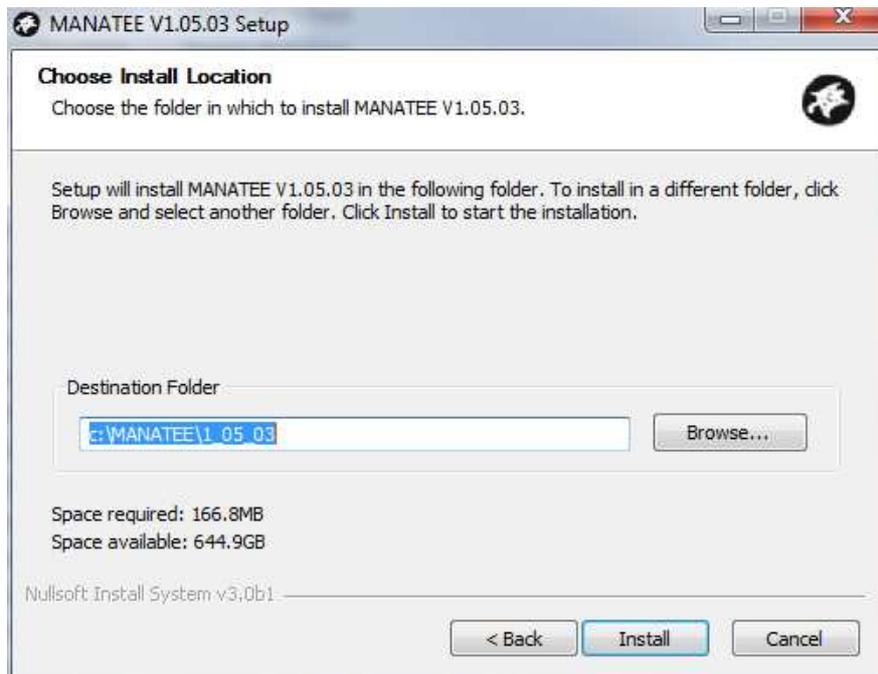
1. The zip file contains a file named **MANATEEvX_Y_Z_setup.exe** (with X_Y_Z the corresponding version number **1_05_03** for instance). You have to launch it to start the installation. The following window should appear:



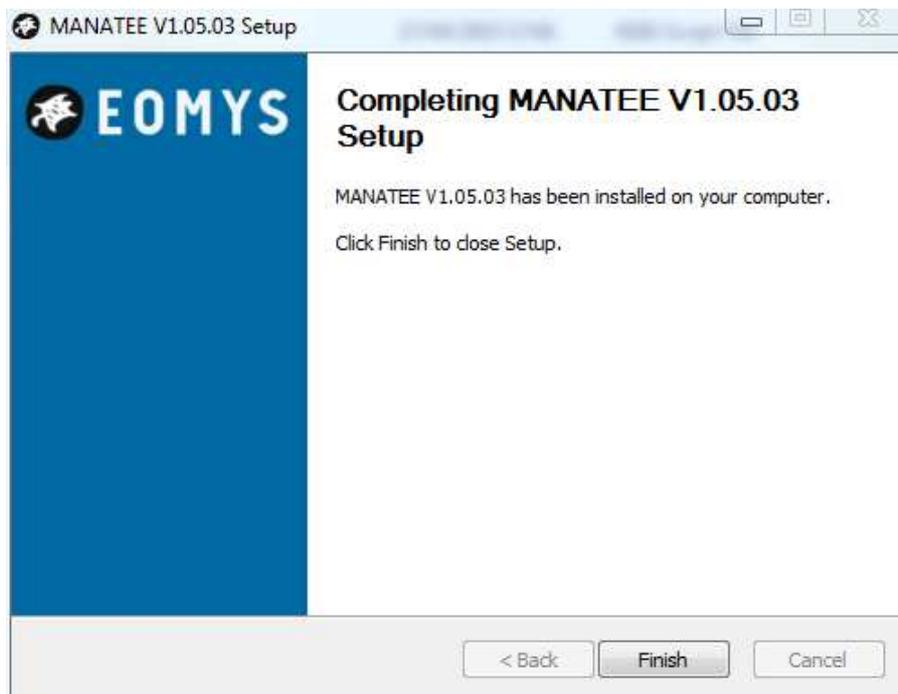
2. Click on the Next Button to continue the installation procedure. The License page is displayed. After reading the license agreement, click the **I Agree** button to accept the license and continue the installation. If you don't agree all the terms of the license, please click on the **Cancel** button and contact EOMYS.



- Now, you have to choose the destination folder in which MANATEE will be installed. The default folder is **C:\MANATEE\X_Y_Z**, but you can change it by clicking on the **Browse** button. After choosing your installation folder you can click on the **Install** button to start the copy procedure.



- The installation is now complete. Before using MANATEE within Matlab environment, some operations have to be done and are explained in the next parts of this documents.



3.2 Installation of FEMM 4.2 for EM3.SCIM and/or EM3.PMSM module

If you haven't purchased the EM3.SCIM and/or EM3.PMSM module or if you have already the FEMM 4.2 Software working on your computer, please go directly to §3.3.

FEMM 4.2 software is licensed under the **Aladdin Free Public License [R2]**. As mentioned in the license, FEMM can't be packaged into the MANATEE installer. In this way you have to download FEMM on the web site of the author and to install it by yourself:

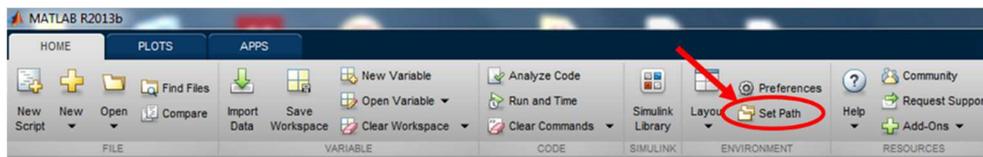
<http://www.femm.info>

The installation is easy, and looks like the MANATEE installation. Nevertheless, if you find a problem, please contact EOMYS to obtain more information.

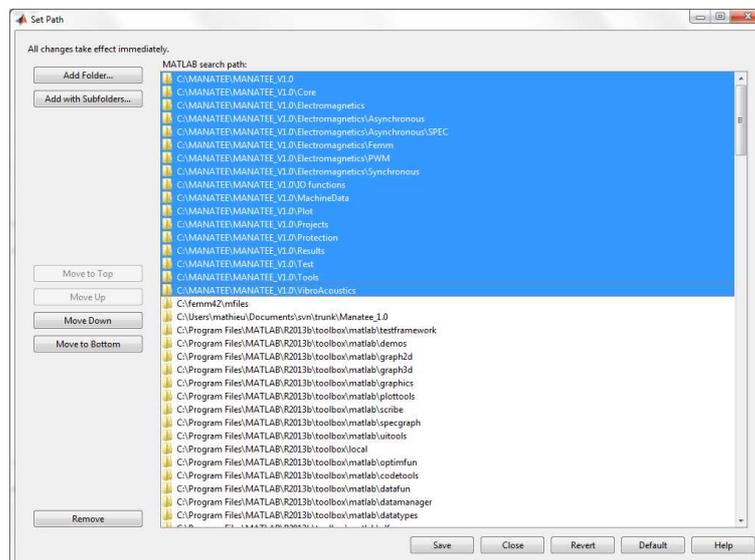
3.3 Matlab Settings

In order to work properly, Matlab has to be setup in order to integrate MANATEE. You have to set the root paths of Matlab, so that it integrate MANATEE scripts.

1. Run Matlab.
2. In the **Home** menu, click on the **Set Path** button as mentioned in the following capture screen.



3. You have to add the install folder of MANATEE, including its subfolders. To do that, click on **Add with Subfolders** and select the right folder which is by default: `c:\MANATEE\X_Y_Z\`. Your window should look like as the following capture. Be aware that only one version of MANATEE can be coupled with Matlab in a same time. If you set the paths to two versions of MANATEE, you will obtain conflicts.



4. Check in same time that FEMM is coupled with Matlab. You should find a path linked to the FEMM folder. If you can't find this line, add it in order to allow a communication between Matlab and FEMM.



- Click on the **Save** button in order that Matlab retains the paths for next restarting.

3.4 License setup

Now that you have install MANATEE's code, you need to install your license. For that you need to run the file "Manatee_license_setup.exe". It will add 2 dll files to your folder C:\Windows\SysWOW64 (for 64 bits machines) or C:\Windows\System32 (for 32 bits machines). Note that these files are linked to your dongle and shouldn't change from a version to another.

4 LAUNCHING MANATEE

4.1 Testing MANATEE

You are now ready to test MANATEE. Please connect your USB dongle to your computer so that MANATEE can check your license. The dongle provided by EOMYS looks like that:



The dongle doesn't need a specific driver and should be directly recognised by your computer. At this moment please run one of the following commands in Matlab workspace (according to the module you purchased):

For induction machine:

```
>>run_MANATEE('tuto_SCIM_01')
```

For permanent magnet machine:

```
>>run_MANATEE('tuto_SPMSM_01')
```

This command launches a default user project on MANATEE and Matlab should give this kind of results without errors showing that MANATEE is perfectly working:

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
[MANATEE] Simulation input parameters loaded.
[MANATEE] Running initial geometrical calculations...
[MANATEE] Running initial magnetic calculations...
[MANATEE] Bertotti loss coefficient fitting results:
  loss data frequency range: 50 - 50
  fitting coefficients: KiIH=183.3435 / KiIF=2380952.381 / KiIE=1.4714
  fitting min / mean / max rel. error (%): 0.20085 / 11.728 / 31.0705
[MANATEE] Checking inputs...
WARNING, there might be some spectral leakage due to asynchronous rotor frequency. Advised number of rotor
revolutions to fully eliminate spectrum leakage effects: Nrev=100
WARNING, null frame width found, frame removed.
[MANATEE] Checking geometrical constraints...
[MANATEE] Computing supply voltage spectrum...
[MANATEE] Computing magnetization properties...
[MANATEE] Calculating airgap flux density...
[MANATEE] Computing magnetic forces and radiated noise...
[MANATEE] Computing constant flux sonagram...
WARNING, constant flux variable speed noise and vibration levels are not valid below 60.1881 Hz / 1203.7618 rpm
[MANATEE] Theoretical vibro-acoustic analysis:
[...]
```

Structural resonance frequencies / modal damping coefficients:

Stator circumferential mode (0,0): f=3426 Hz, ksi=2 %

Stator circumferential mode (2,0): f=638 Hz, ksi=2 %

Stator circumferential mode (3,0): f=1581 Hz, ksi=2 %

Stator circumferential mode (4,0): f=2601 Hz, ksi=2 %

Stator circumferential mode (5,0): f=3557 Hz, ksi=2 %

Stator circumferential mode (6,0): f=4361 Hz, ksi=2 %

Radiating surface: 0.45082 m²

Directivity factor: 2

Microphone position: 1.205 m away from center

A-weighted total sound power level LwrA (dBA): 101.9289

A-weighted total sound pressure level LpA (dBA) 92.3274

Maximum A-weighted sound power level LwrA_max (dBA) at variable speed based on constant flux sonagram: 109.2306

4.2 Using MANATEE

For more information about using MANATEE software, please read the documentation on our website [R5]. You can launch MANATEE from any folder in Matlab, but simulation projects, electrical machine data and simulation results are stored in some specific MANATEE folders.

5 REMOVING MANATEE

If you decide to remove your version of MANATEE from your computer, please simply delete the folder containing MANATEE. Be sure you have done a copy of your projects, your machine data and your results present respectively in the folder **/Projects**, **/MachineData** and **/Results**.