

EL-sizing

Online help

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1 System Requirements

1.1 Operating System

WINDOWS 2000 / XP / Vista

EL-sizing requires the Windows 2000, XP or Vista operating system.

1.2 Memory

Memory required is 256 MB RAM.

1.3 Graphics card

The graphics card must be set for a resolution of at least 800 x 600 pixels.

1.4 Software

EL-sizing is supported by Java Runtime from Version 1.6

Results documents are produced in Acrobat Reader from Version 6.0.

2 Conditions of Use

Conditions of Use for the EL-sizing software supplied free of charge by HOERBIGER-ORIGA GmbH.

2.1 General

In the absence of any other special agreements, the use of the EL-sizing software is governed by these Conditions of Use. By installing, passing on or using this software, the user (customer) acknowledges his understanding and acceptance of these Conditions of Use. The user licence is terminated automatically if the Conditions of Use are not observed.

To use the EL-sizing software the user will need the Windows 2000, XP or Vista operating system, 256MB RAM memory, Java Runtime 1.6 and Adobe Acrobat Reader 6.0. The user agrees to receive product information and operating instructions from the licensor. The EL-sizing software is designed to provide the user with information on individual products of the licensor. Accurate data input remains the sole responsibility of the user. The result from the EL-sizing software constitutes a non-binding suggestion from the licensor and does not replace individual technical consultation.

2.2 User Rights

The licensor supplies the EL-sizing software to the user free of charge as a support tool for sizing its electric linear drives. The licensor grants the user a non-exclusive, simple licence to use the software. Copying or passing on to third parties, in whatever manner or for whatever reason, is only permissible with the prior agreement of the licensor. The user undertakes to use the EL-sizing software in compliance with relevant current legislation. The EL-sizing software remains the intellectual property of HOERBIGER and is protected by copyright. All rights, especially copyright and other industrial property rights, remain the property of the licensor.

2.3 Guarantee/Liability

The licensor is responsible for the fitness for purpose of the licensed EL-sizing software. It must function without significant technical faults. The user must inform the licensor of any apparent faults in the software. Upon request the user must provide the licensor with all information and documentation required for removal of the fault.

The licensor shall not be liable to the user or to third parties, either directly or indirectly, for consequential damage such as loss of profits, operational delays or damage to other software caused by the EL-sizing software. The licensor shall also not be liable for the compatibility of the software with the hardware used by the user or for damage arising from incorrect use, input of incorrect data, modification of the EL-sizing software or hardware faults. If the user uses additional software not supplied by the licensor, the licensor shall not be liable for correct functioning of the EL-sizing software nor for resulting faults or damage. The licensor shall be liable, regardless of the legal reason, only for damage caused intentionally or by gross negligence, or for which the licensor has compulsory liability under the Product Liability legislation. Liability for compensation is limited to the damages usually arising in comparable cases. Liability for data loss is limited to the typical costs of replacing the data assuming that security copies were made regularly at intervals appropriate to the circumstances.

The licensor shall not be responsible for the EL-sizing software producing specific results. This also applies to the usability of the EL-sizing software for the agreed purpose or any other purpose. The risk of economically viable usability lies with the user.

The claims of the user expire 12 months after supply of the software.

The licensor has the right to change or add to the Conditions of Use and/or the EL-sizing software at any time. Further development, modification or adaptation of the software is not agreed or guaranteed.

2.4 Final Conditions

The Conditions of Use are governed exclusively by the laws of the Federal Republic of Germany. The regulations of the UN Convention on Contracts for the International Sale of Goods (CISG) are expressly excluded. The court of jurisdiction is, insofar as this is legally permissible, Stuttgart.

If one or more of the clauses of these Conditions of Use become ineffective, illegal or impracticable, the validity of the rest of the Conditions of Use is not affected. Such an ineffective, illegal or impracticable clause shall be replaced by a new clause which comes closest to achieving the purpose of the original ineffective, illegal or impracticable clause.

For international customers the Conditions of Use are translated into several languages, but only the German and English versions of the Conditions of Use are legally binding

3 Operation

3.1 General

The EL-sizing software assists users with the sizing of HOERBIGER electric linear drives. After input of the parameters for a planned application the programme suggests a selection of drives.

Starting the programme opens the EL-sizing user interface. In the "Input" field the user is asked to input the parameters of the planned application.

- "Main selection" – Type of drive, installation position and total stroke
- "Load data" – moving mass, direct force or force from external guide
- "Motion profile" – specific movements (e.g. speed and acceleration)
- "Project data" – User data and description of calculation

If the user then requests the calculation, the programme generates a list of possible drives in the "Selection" field. The user can then select a drive and, in a further operation, add a suitable motor and gearbox to the selection.

Finally the calculation can be saved as a file with file name extension .elsi, and technical documentation and a parts list can be produced in PDF format.

3.2 Programme start

EL-sizing can be started from the CD or can be installed first and then started on the PC.

3.2.1 CD

To carry out an EL-sizing calculation or to install the software:

- Insert the CD.
- The CD starts automatically.
- Follow the instructions.

3.2.2 Installation

After installing the software, to carry out an EL-sizing calculation:

- Program → EL-sizing → el-sizing.bat / Double-click on el-sizing.bat.
- The programme is started.
- (On first start-up only) read the Conditions of Use carefully.
- Click on the "Accept" button and the EL-sizing user interface opens.
(Clicking on the "Decline" button closes the EL-sizing programme.)

Note: For faster start-up, create a shortcut on the Desktop..

3.3 Menu Bar

3.3.1 File

"Menu → File → New calculation"

To reset all parameters in the user interfaces.

"Menu → File → Load calculation..."

To access an already saved calculation file.

"Menu → File → Save calculation"

To save the file in the stated path with the existing file name.

"Menu → File → Save calculation as..."

To save the file, entering a different path and/or a different file name.

"Menu → File → Print calculation"

To create a PDF file with the technical data of the calculation for printing or saving.

"Menu → File → Close"

To close the programme.

3.3.2 Language

"Menu → Language → ..."

To select a language (e.g. German or English).

3.3.3 Help

"Menu → Help → Online Help"

To access Online Help.

"Menu → Help → Info"

To display general information on the EL-sizing programme.

"Menu → Help → Conditions of Use"

To display the Conditions of Use for the EL-sizing programme.

3.4 Input

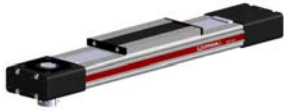
3.4.1 Main Selection

In the "Main selection" the user specifies the type of drive, installation position and total stroke length. Three types of drive are available, differentiated by their motion type and installation position:

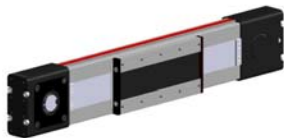
Carriage

The external moving mass is mounted on the carriage. The carriage travels along the profile. The installation position differentiates between horizontal and vertical motion tasks. Horizontal motions are additionally differentiated by the position of the carriage, which is dictated by the application: the external moving mass can be mounted on the top, side or underside of the profile.

Type of drive: carriage
Installation position: horizontal, top



Type of drive: carriage
Installation position: horizontal, side



Type of drive: carriage
Installation position: horizontal, underside



Type of drive: carriage
Installation position: vertical



Piston Rod

The external moving mass is mounted on the end of a piston rod. In general, use of an external guide is recommended. Movement is effected by an extending and retracting piston rod. The installation position differentiates between horizontal and vertical motion tasks.

Type of drive: piston rod

Installation position: horizontal



Type of drive: piston rod

Installation position: vertical



Cantilever Axis

The external moving mass is mounted on the end of the profile. The profile itself is the moving part. The installation position is vertical.

Type of drive: cantilever axis

Installation position: vertical

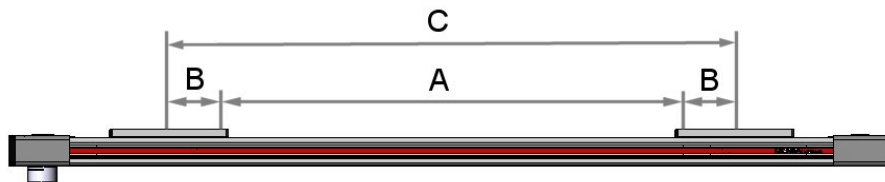


Total Stroke

The total stroke is the maximum distance that the external moving mass has to travel. An additional safety clearance allowance is recommended. Every EL-sizing calculation result automatically includes a suggested "order stroke", i.e. the actual stroke length to be ordered:

Order stroke [C] = total stroke required [A] + safety clearance [B].

Note: The mechanical end position must not be used as a mechanical stop.



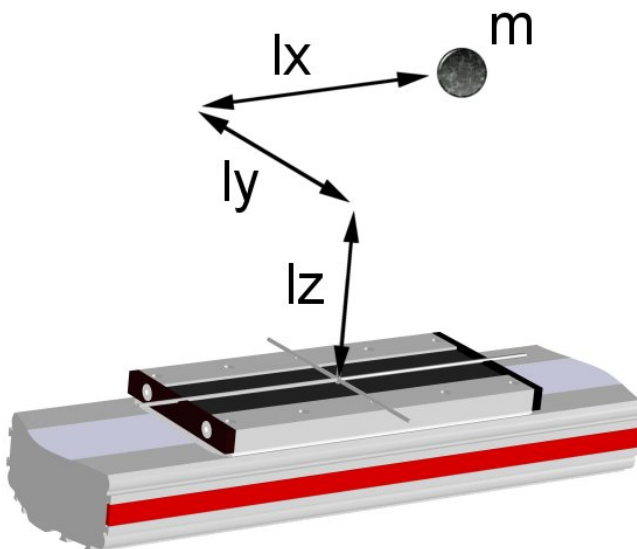
3.4.2 Load Data

With the load data the user specifies the effect of mass and/or force. The user can fit an external guide, if required.

Mass

The external mass to be moved and its distance from the carriage must be specified by the user. The length of the lever arms l_x , l_y and l_z are determined relative to the central mounting point on the carriage.

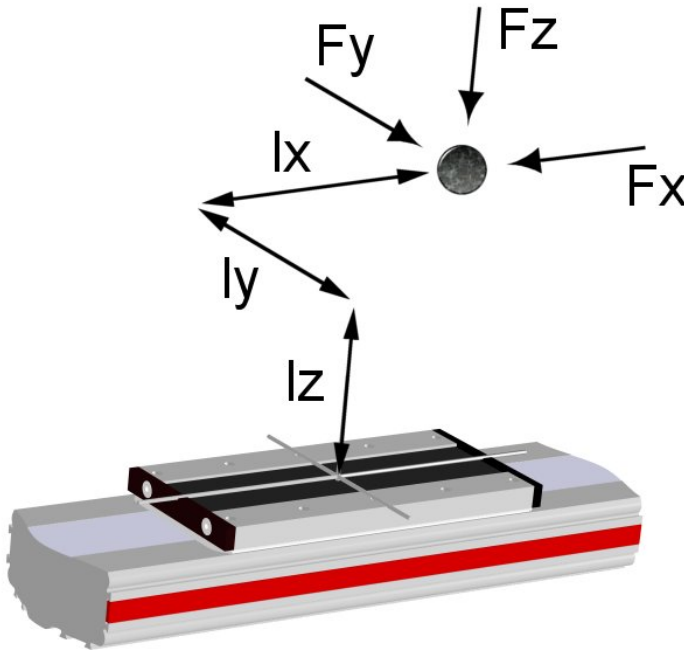
Note: The external moving mass generates moments which are expressed as static or dynamic moments. Static moments are caused by gravity ($M = m \cdot g \cdot l$). Dynamic moments are calculated based on the motion profile inputs ($M = m \cdot a \cdot l$).



Force

If forces occur which can operate alone or in addition to the moving mass, these must be specified by the user. Forces in the F_x , F_y and F_z directions can be input. The point of impact on which the force acts is determined by the length of lever arms l_x , l_y and l_z relative to the central mounting point on the carriage

Note: Forces generate moments which are expressed as static moments. Static moments are caused by the force ($M = F \cdot l$).



External Guide

If the user selects "External guide", the programme suggests only the linear drive, not a combination of linear drive and external guide. If this function remains deactivated, EL-sizing calculates all possible combinations of linear drive and guide.

The user can fit an external guide to take up the moments and forces of the moving mass. The force F_{ext} resulting from the movement must be specified by the user. The point of impact on which the force F_{ext} acts is determined by the length of the lever arm l_z centrally to the mounting point on the carriage.

Note: The force F_{ext} generates a moment M_y , which is expressed as a static moment ($M_y = F_{ext} \cdot l_z$). The input fields for mass and force are no longer taken into account when the external guide field is activated.

3.4.3 Motion Profile

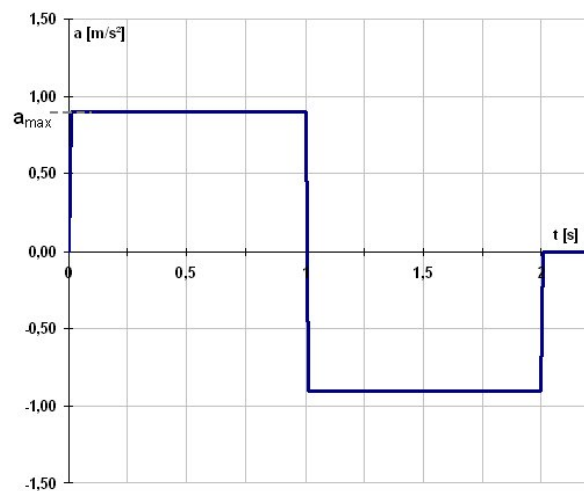
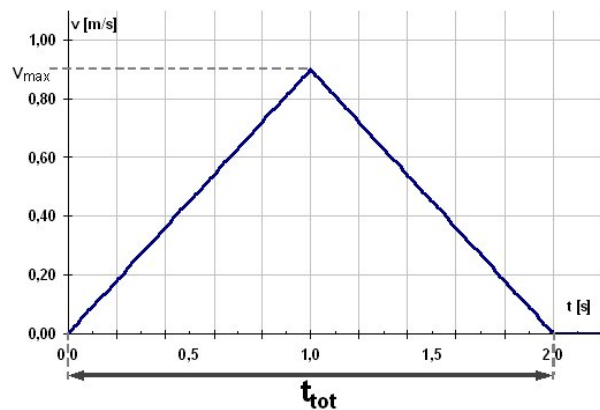
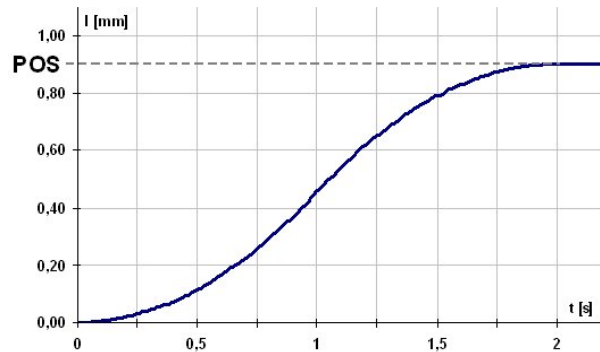
With the motion profile the user specifies the details of a motion. A sequence of different movements can be input. The positioning in each movement must be entered exactly. The end position of a movement is specified by the user and the programme calculates the relative distance travelled. The speed at the beginning and end of a movement is assumed to be 0. When input mode is selected, the parameters can be entered in the relevant fields. Load data for mass and/or force have to be input.

Note: The movement generates loads such as moments and action forces. These resulting forces are taken into account in the EL-sizing calculation.

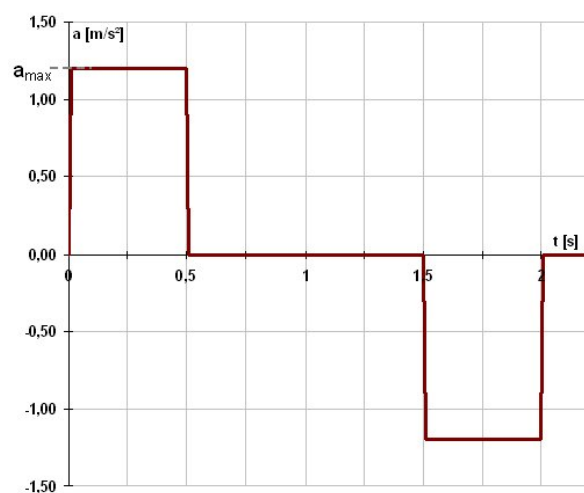
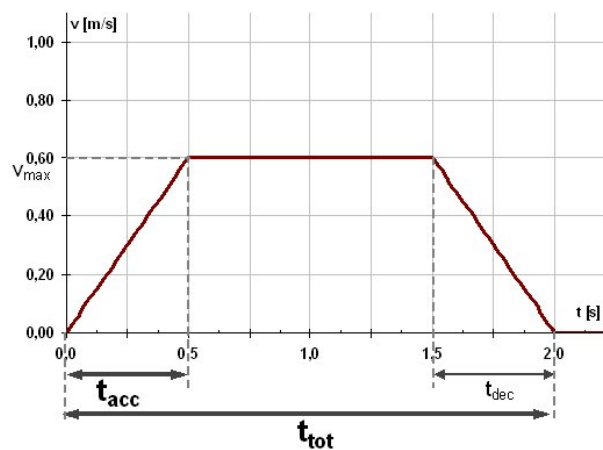
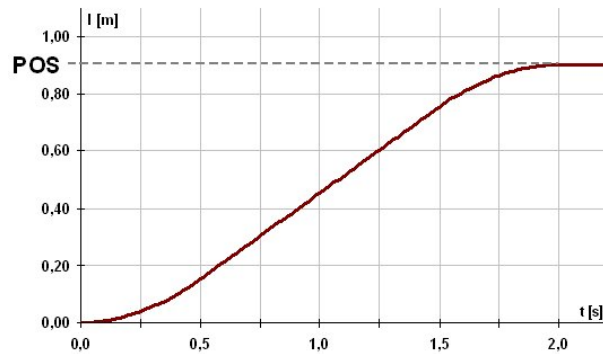
Input Mode

With the input mode, the user can choose between three different input possibilities:

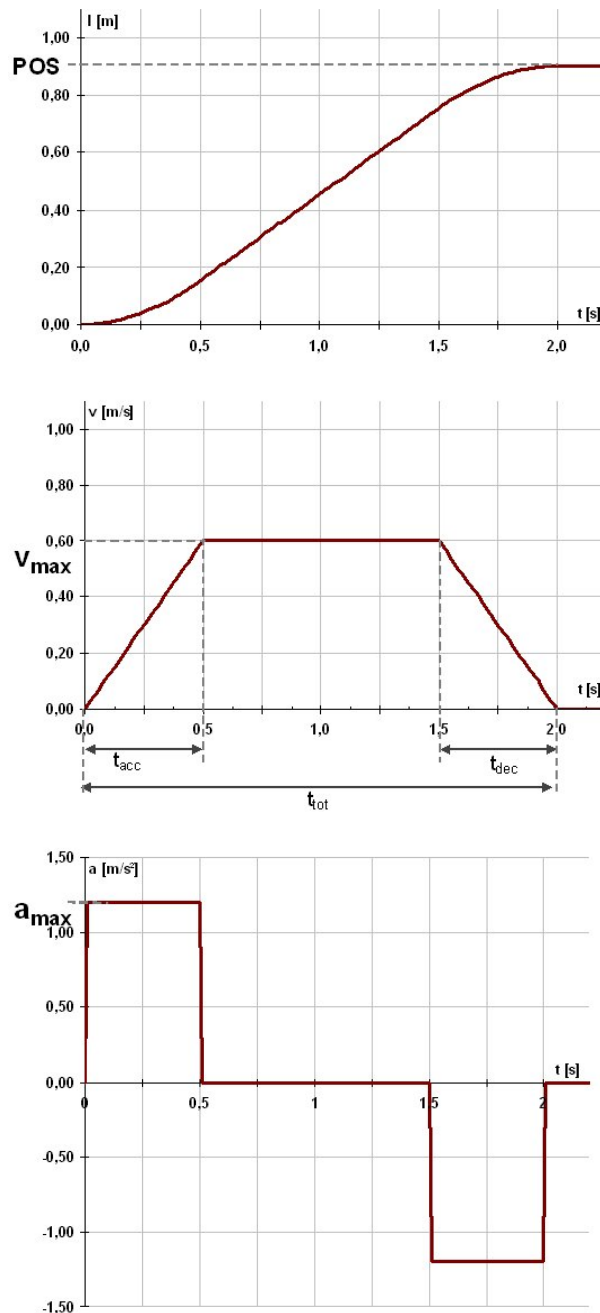
- t_{tot} : total movement time
With the input of t_{tot} the time to be taken for the movement is specified. The acceleration and deceleration time are assumed to be $t_{\text{acc}} = t_{\text{dec}} = \frac{1}{2} t_{\text{tot}}$. This gives a triangular speed profile (speed ramp). Maximum speed is reached in the middle of the travel.



- $t_{\text{tot}} / t_{\text{acc}}$: acceleration and total movement time
 With the input of t_{tot} and t_{acc} the time for the movement and the time for the acceleration are specified. The acceleration time has to be input with $t_{\text{acc}} < \frac{1}{2} t_{\text{tot}}$. This results in a trapezoid speed profile (speed ramp). Maximum speed is reached at the end of the acceleration time t_{acc} and is then assumed to be constant until deceleration of the movement begins.



- v_{\max} / a_{\max} : speed and acceleration
 With v_{\max} the maximum speed to be reached is specified. With a_{\max} the acceleration is specified.
 The acceleration selected must be high enough to enable the required speed to be reached and vice versa. This results in a trapezoid speed profile (speed ramp).



Load Selection

For the individual movement the user can specify whether mass or force are to act individually, jointly or not at all. If the use of an external guide is specified, the load selection is not taken into account.

3.4.4 Project Data

In Project Data the user can input his contact data. The input field for the description of the planned application is very important. Here the application can be described and changes made in the course of the calculation process can be documented.

3.5 Selection

When the user has input all the required data, clicking on the "Update" button generates a selection of drives.

Note: If parameters are then changed in the input field, the selection must be regenerated by clicking on "Update" again..

3.5.1 Drive / Guide

In Drive/Guide the selection differentiates between belt drive and spindle drive. When one of the linear drives in the list is selected, a detailed description is displayed, together with the corresponding technical data. If something is then changed in the Drive/Guide selection, all the following steps must be carried out again.

Note: In calculating the guide's lifetime, the programme automatically applies an upper limit to the theoretical calculation. There is no implied guarantee that the lifetime value displayed will be achieved, because the specific application and installation environment have a major influence on lifetime.

When the user has selected a drive/guide, he can then go on to select a motor and gearbox.

3.5.2 Motor / Gearbox

The display in Motor/Gearbox selection is determined by the drive/guide selected. Motors are differentiated between servo motor and stepper motor or only by gearbox type. Selection of one of the motor/gearbox combinations shown in the list brings up the corresponding technical data for load and inertia ratio.

3.5.3 Product Overview

The Product Overview shows the products selected by the user. Clicking on "Print Calculation" generates a PDF document showing the technical data, which can be checked, and then printed or saved. The button "Parts List" generates another PDF document which also suggests a selection of accessories.

Note: To return from a PDF document to the programme, the PDF file must be closed. In this way the user can avoid a situation where changes are made in parallel in the programme but are not updated in the PDF document.