

“How to use SinaSave” (Status: September 2009)

SIEMENS



SinaSave® 4.0

Products



| | SinaSave 3.0 | SinaSave 4.0 |
|-------------------------|-----------------------|---------------------------------------|
| VSD (low voltage) | Micromaster 430 / 440 | Micromaster 430 / 440 |
| | SINAMICS G150 | SINAMICS G150 |
| | --- | SINAMICS G110 / G120 /G130 (NEW) |
| VSD (medium voltage) | --- | Robicon Perfect Harmony (NEW) |
| | --- | SINAMICS GM150 (NEW) |
| HTDD | --- | HT-direct – air-cooled - (690V) (NEW) |
| FSD | IEC motors | IEC motors |
| | NEMA motors | NEMA motors |

SinaSave® 4.0

Calculation Module (NEW)



Fixed Speed Drives

Mechanical system assessment

Variable Speed Drives (LV / MV)

High Torque Direct Drives

Infrastructure costs

HT-direct - SINAMICS G150

Discount for drive converters

Gear unit - N-compact - SINAMICS G150

Business economic data

Gear unit – third-party induction motor - SINAMICS G150

Subsidies

Gear unit – third-party induction motor – third-party drive converters

Operating characteristics

Saving operating expenses

Working machine

SinaSave® 4.0

Functions (NEW)

SIEMENS

Automatic update function

Resetting input values

Mechanical system assessment for 4-pole motors (Fixed Speed Drives)

Conversion – metric into the Anglo-American system of dimensions

Resetting input values

Central screen form to select the language, currency, pressure units / flow units and project data

Dynamic exchange rate update through EZB

Export to Microsoft Office

Optimized lifecycle cost calculation (VSD)

SinaSave® 4.0

User-friendliness



| SinaSave 3.0 | SinaSave 4.0 |
|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| The information area for the help relating to the input and output fields is centrally arranged | The help for the particular input and output field is associated with the specific input and output field |
| When entering data, a check is not made for errors | When entering data, a check is made for errors |
| Result sheet | Improved output structure of the result sheet |

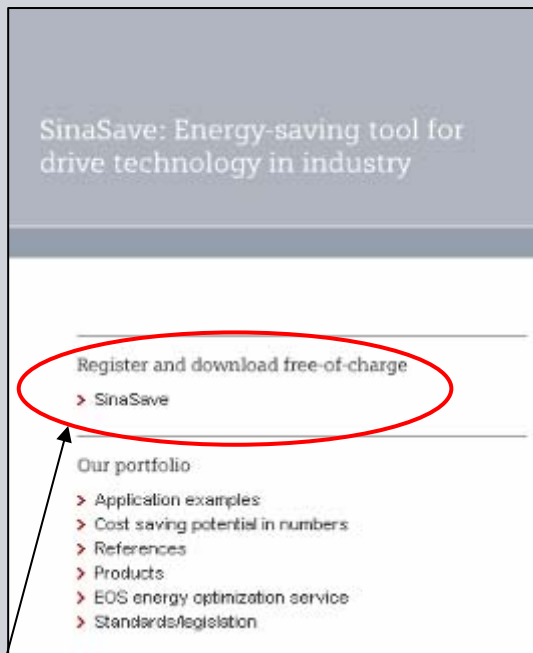
SinaSave® 4.0

Download from the Internet - Part I



www.siemens.com/energysaving (general information about energy saving)

Link to SinaSave: www.siemens.com/sinasave



Click here and register

Fill in the form and submit

Energy-Efficient Drive Technology

SinaSave
Software Download

You will receive an e-mail with all info to download the software.

Please enter your postal address:

Last Name* First Name*
Company* Industry*
Zip Code* City*
Street* State*
Country* Other Country*
Phone* Fax*
Email* * These fields are mandatory.

Statement on Privacy Policy

To allow us to collect, process, use and pass on your personal data and information as described, please click "I agree".

I agree
 I do not agree

Submit Reset

SinaSave® 4.0

Download from the Internet - Part II



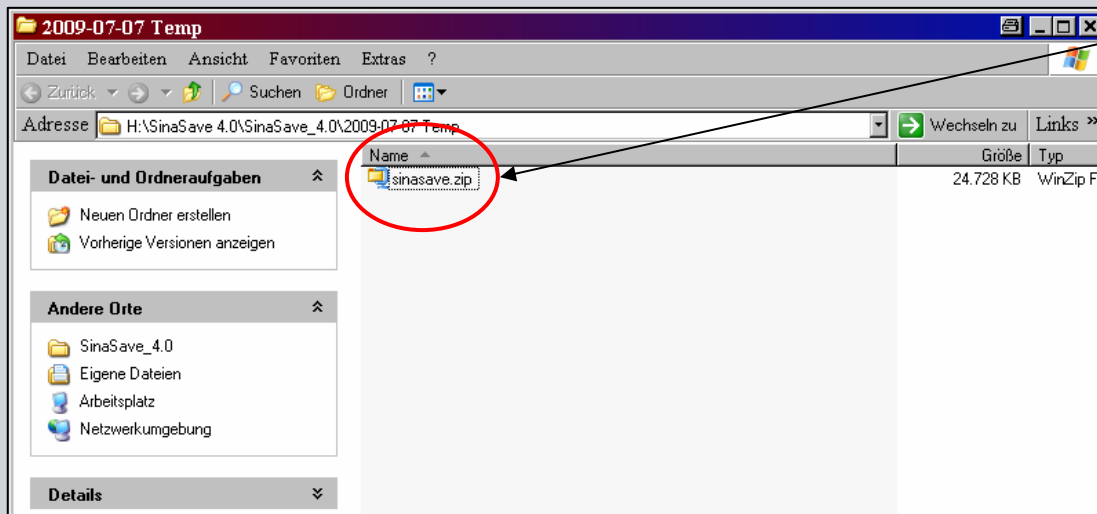
Dear Mrs./Mr. Chrimes,

thank you very much for choosing SinaSave.
Here you can download the software:

<http://www.automation.siemens.com/cgi-extern/send-file ld.pl/9456/sinasave.zip>

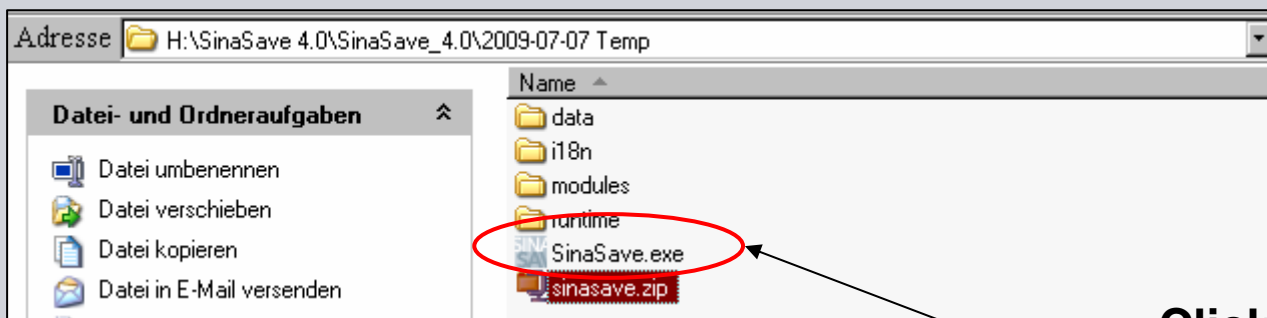
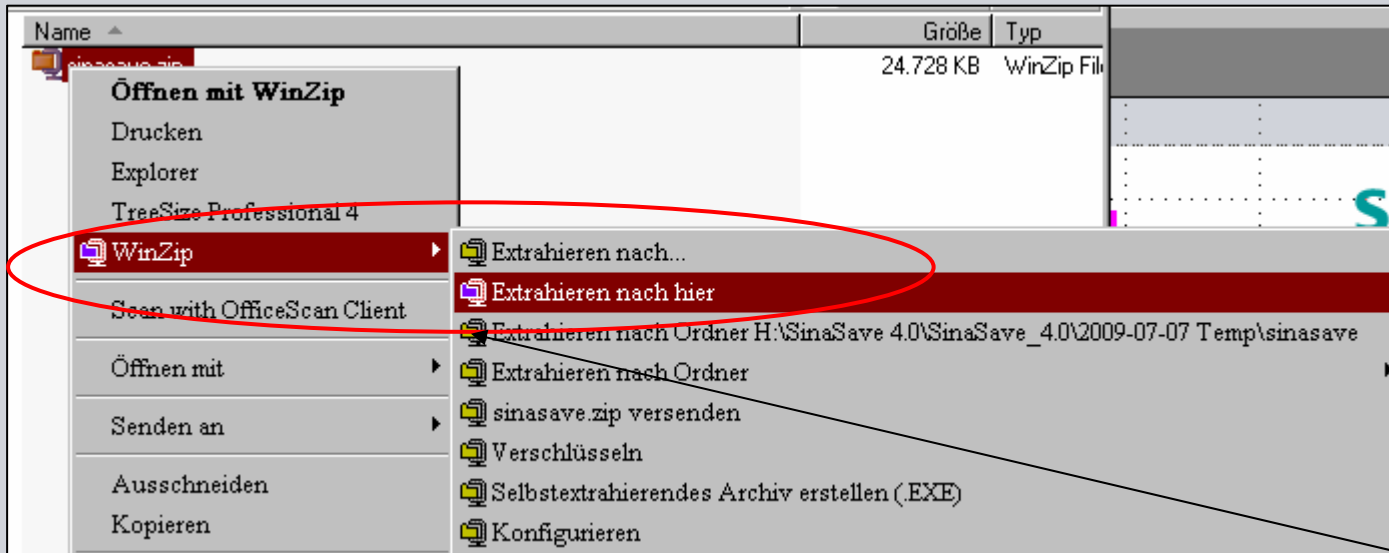
E-Mail

Click on the link
and open with
WinZip



SinaSave® 4.0

Download from the Internet - Part III



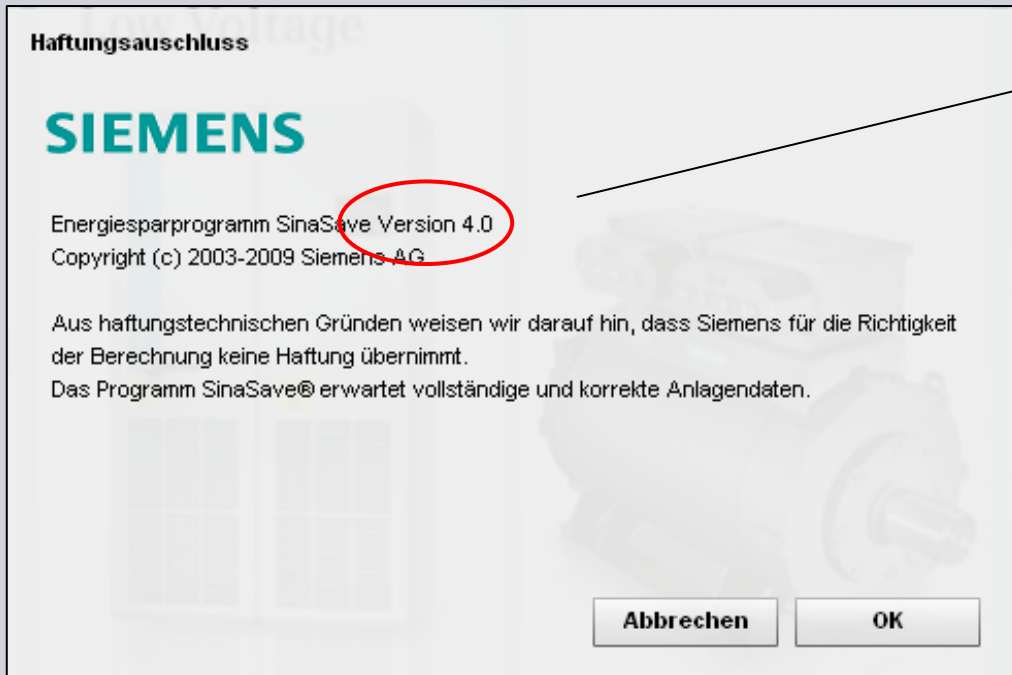
Righthand mouse click and select “extract to here”

Click on SinaSave.exe

SinaSave® 4.0

Start / update

SIEMENS

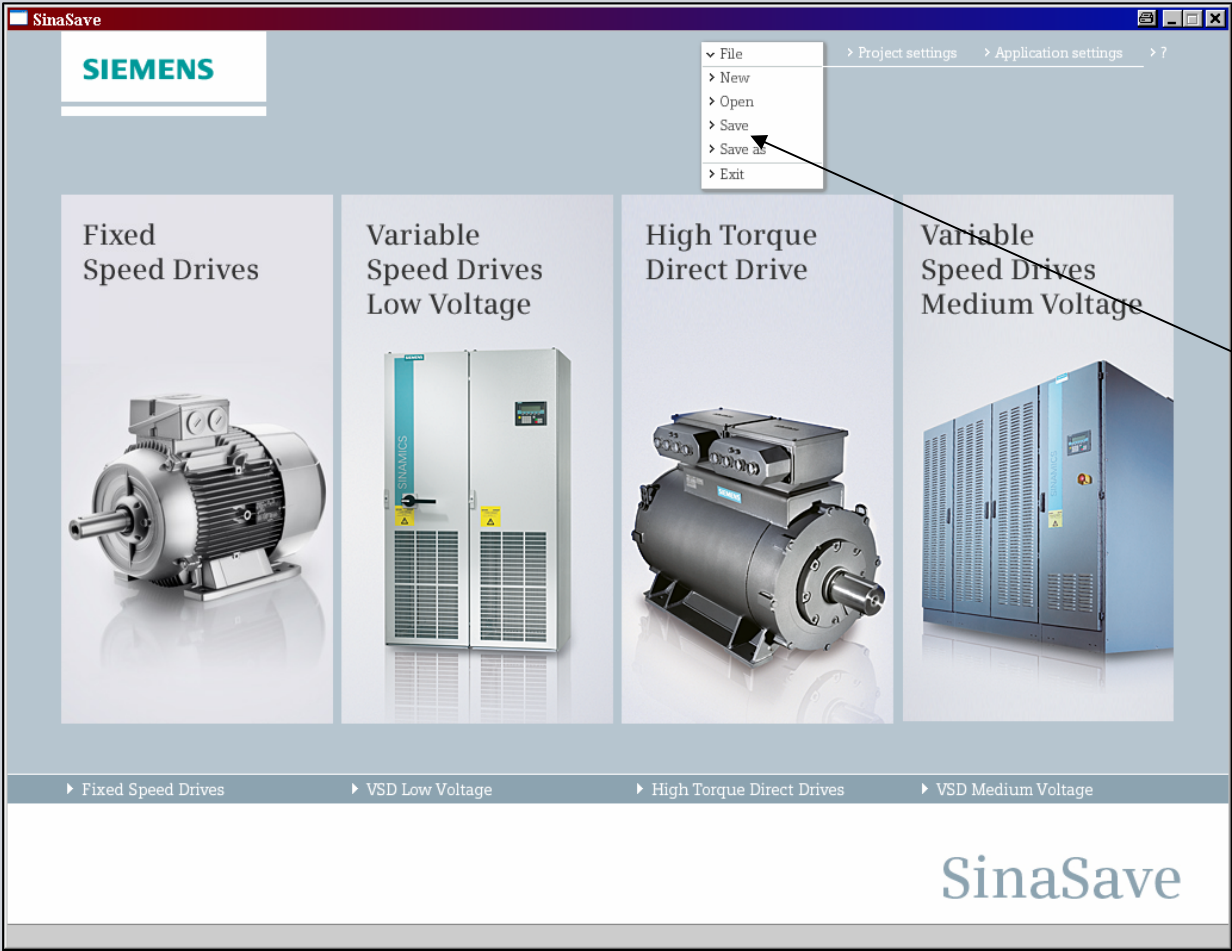


Current version

NEW: Automatic update function → runs when connecting with the internet (it involves, e.g. product prices)

SinaSave® 4.0

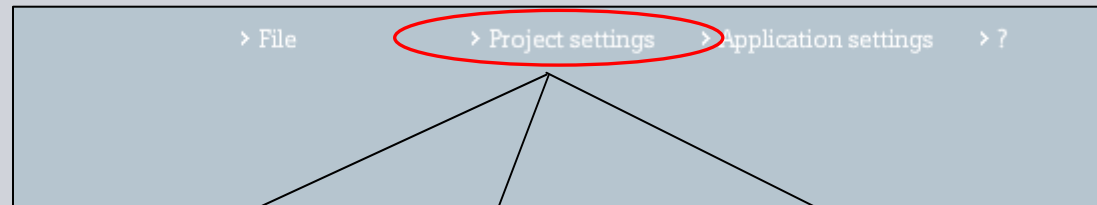
Project management



**Set-up a new project,
open and save**

The following entries are possible :

- Sales partner
- Customer data
- Project description



Project Settings

Sales partner | Customer data | Project description

Name

Department

Business unit

Phone

Fax

E-Mail

Our sign

Cancel Save

Project settings

Sales partner | Customer data | Project description

Name

Department

Company

Phone

Fax

E-Mail

Your sign

Cancel Save

Project Settings

Sales partner | Customer data | Project description

Project

Plant

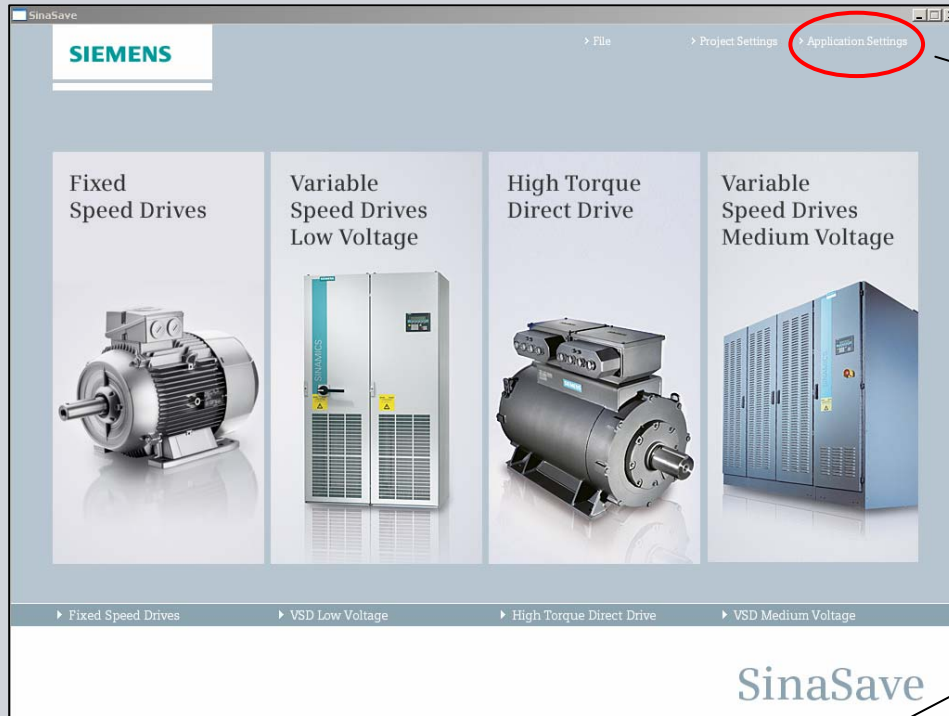
Date

Comment

Cancel Save

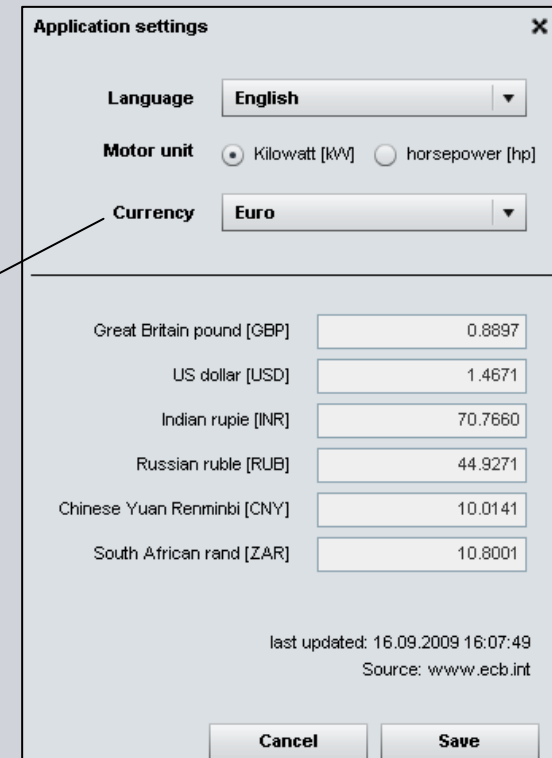
SinaSave® 4.0

Application settings – language and currency



9 languages

German, English, Chinese, Spanish, Italian, French, Portuguese, Russian, Turkish

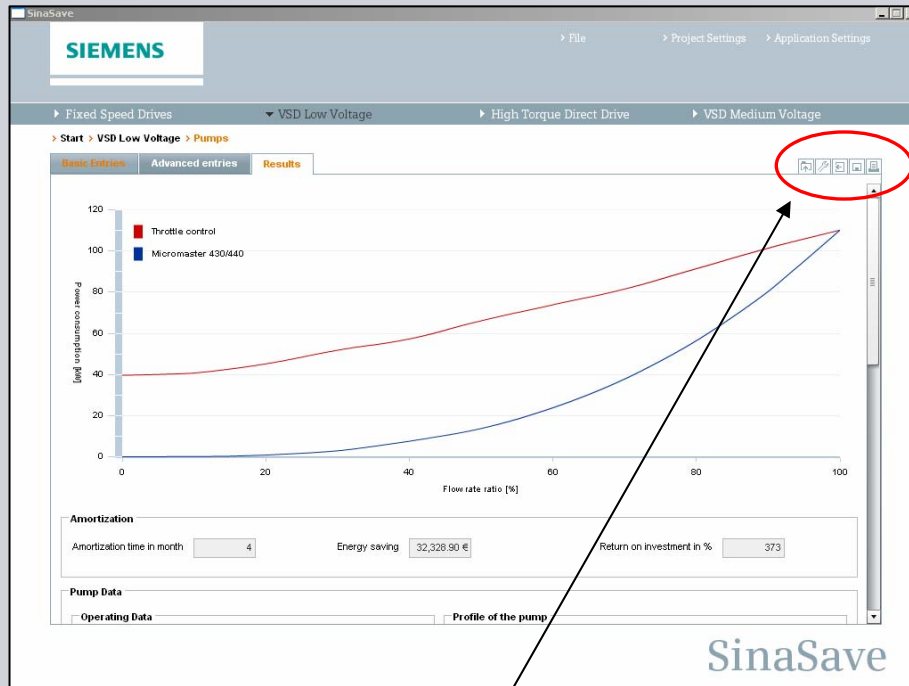


| Exchange rates | |
|-----------------------|-----|
| Pound sterling | GBP |
| US dollar | USD |
| Indian Rupee | INR |
| Chinese yuan renminbi | CNY |
| Russian rouble | RUB |
| ✓ Euro | EUR |

Up-to-date
currency table

SinaSave® 4.0

Additional functions



- Export to
- (Project) setting
- Reset of the entered data
- Save
- Print

Settings

Conversion from the metric into the Anglo-American system of dimensions

Fixed Speed Drives

Basic entries - (IEC energy-saving motors) - EFF1 to EFF2



Enter the motor power rating, pole number, frame material, motor load, operating hours, discount, price, quantity of motors (when calculating a plant or system with several motors)

Mechanical components (4-pole motors only) (NEW)

| Parameter | 1. EFF1 | 2. EFF2 |
|------------------------------------|-----------------------|-----------------------|
| Motor designation | 1LE1001-1DB4-..... | 1LE1002-1DB4-..... |
| Motor power rating in kW | 15 | 15 |
| Number of poles | 4 | 4 |
| Frame material | Aluminium | Aluminium |
| Motor load | 4/4 | 4/4 |
| Operating hours per year | Shift operation (400) | Shift operation (400) |
| Efficiency in % | 92.00 | 89.40 |
| Energy price in EUR / kWh | 0.120 € | 0.120 € |
| Energy consumption per year in kWh | 65,217.39 | 67,114.09 |
| Energy costs per year in EUR | 7,826.09 € | 8,053.69 € |
| List price in EUR | 3,130.00 € | 2,320.00 € |
| Customer discount in % | 50.00 | 50.00 |
| Customer price in EUR | 1,565.00 € | 1,160.00 € |

Mechanical system consideration

4-pole motors only

Yes

No

Calculation of amortization

Number of motors: 1

Payback period in operation hours: 7,117.62

Saving per year in kWh: 1,896.70

Saving costs per year in EUR: 227.60 €

Fixed Speed Drives

Mechanical system assessment - (IEC energy-saving motors) - EFF1 to EFF2



The screenshot shows the SinaSave software interface. At the top, there is a navigation bar with 'SIEMENS' and menu options like 'File', 'Project settings', and 'Application settings'. Below this, a breadcrumb trail reads '> Start > IEC energy saving motors > EFF1 vs. EFF2'. The main content area is divided into three tabs: 'Basic entries', 'Results', and 'Mechanical system consideration', with the latter being the active tab. The 'Mechanical system consideration' tab contains several sections: 'Gear settings' with a 'Please choose' dropdown for 'Gear Type'; 'Additional elements' with radio buttons for 'Direct mounted - 100%', 'Coupling - 100%', 'V-belt drive - 80%', 'Chain drive - 90%', 'Timing belt - 98%', and an empty input field for a custom percentage; 'Calculation of power loss' showing 'Motor power rating' (15 kW), 'Motor efficiency' (92%), 'Motor power dissipation' (1.20 kW), 'Gear' (100%), and 'Transmission element' (100%), resulting in a 'Total efficiency' of 92.00%; and 'More information' with links for 'Contact person', 'MOTOX catalog', 'MOTOX configurator', and 'SD configurator'. The SinaSave logo is at the bottom right of the interface.

5 different transmission categories selectable

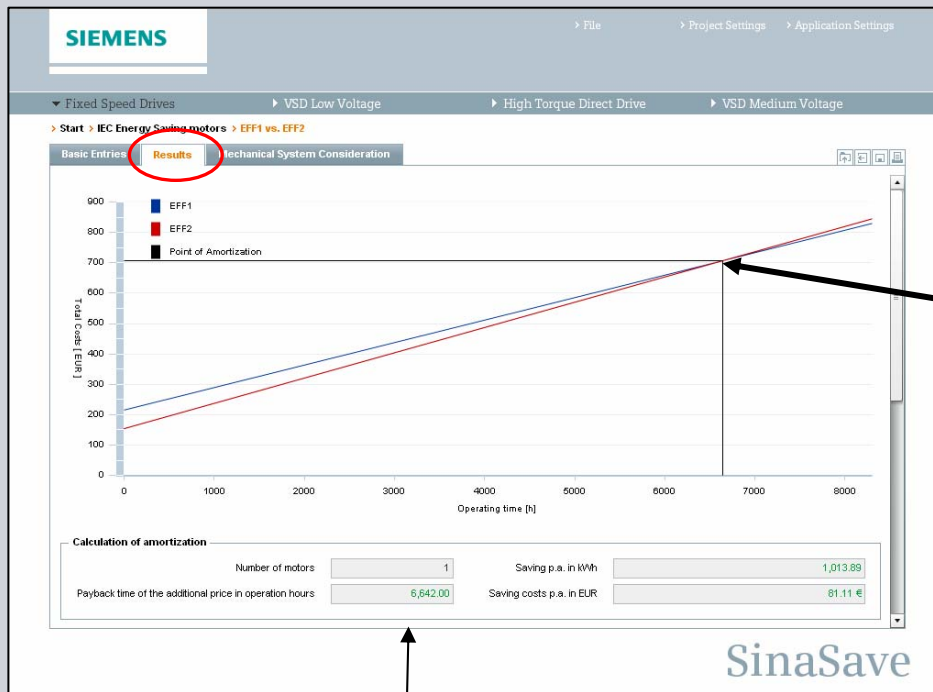
Individual value can be entered

The calculated total efficiency is not included in the results

Internet links to actual catalogs and configurators

Fixed Speed Drives

Results - (IEC energy-saving motors) - EFF1 to EFF2



Numerical analysis:

Analysis of the entered data:
payback time, saving in kW
and saving in € p.a.

| Mechanical system consideration | | | | |
|-------------------------------------------|------------------------------------|----|---------------------------------|----------------------------------------------------|
| Total efficiency | <input type="text" value="79.38"/> | % | Additional transmission element | <input type="text" value="Direct mounted - 100%"/> |
| Motor efficiency | <input type="text" value="81"/> | % | Gear Type | <input type="text" value="--"/> |
| Motor power dissipation | <input type="text" value="0.14"/> | kW | Number of stages | <input type="text" value="1-stage"/> |
| Power dissipation (mechanical components) | <input type="text" value="98.00"/> | % | Ratio | <input type="text" value="--"/> |

Graphic analysis:

Visual analysis of the payback time with two graphs.

Breakeven point - it's your cash from this point onwards

| | EFF1 | EFF2 |
|-------------------------------|----------------|----------------|
| Motor | 1LA9083-4KA... | 1LA7083-4AA... |
| Motor output in kW | 0.75 | 0.75 |
| Pole number | 4 | 4 |
| Frame material | Aluminium | Aluminium |
| Motor load | 1 | 1 |
| Operating hours p.a. | 8,760.00 | 8,760.00 |
| Efficiency in % | 81.00 | 72.00 |
| Energy costs per kWh | 0.080 € | 0.080 € |
| Power consumption p.a. in kWh | 8,111.11 | 9,125.00 |
| Energy costs p.a. | 648.89 € | 730.00 € |
| List price | 430.00 € | 307.00 € |
| Customer discount in % | 50.00 | 50.00 |
| Customer price | 215.00 € | 153.50 € |

Variable Speed Drives (Low Voltage)

Basic entries - Fans

SIEMENS

The screenshot shows the SinaSave software interface for configuring fans. The interface is divided into several sections:

- Navigation:** Fixed Speed Drives, VSD Low Voltage (selected), High Torque Direct Drives, VSD Medium Voltage.
- Start > VSD Low Voltage > Fans**
- Basic entries (highlighted with a red circle):** Advanced entries, Results.
- Fan settings:** Total differential pressure Δp_{tot} (20.00 mbar), Volume Flow Q (10,000.00 m³/h), Rotational speed n (2,950.00 1/min), Density of the medium ρ (1.20 kg/m³), Specific speed n_q (104.46 1/min), Fan capacity P_{fan} (6.17 kW), Fan efficiency $\eta_{fan,opt}$ (90.00 %).
- Motor data:** Power rating P_{el} (6.43 kW), Electrical efficiency η_{el} (96.00 %).
- Profile of the fan:** Days/Year (365), Flow rate ratio in % (10, 20, 30, 40, 50, 60, 70, 80, 90, 100), Hours per day (0.0, 1.2, 2.4, 3.6, 4.8, 4.8, 3.6, 2.4, 1.2, 0.0, 24.0), Efficiency in % (17.1, 28.8, 41.4, 51.3, 60.3, 69.3, 79.2, 83.7, 87.3, 90.0).
- Selection of the typical plant:** with static part in % of H (0 %), dynamic part only (selected).
- Economic data:** Energy price per kWh (0.080 €).
- Selection of the converter:** Cabinet units (Sinamics G150 400V, Sinamics G150 500V, Sinamics G150 690V), Chassis units (Sinamics G110 230V, Sinamics G120 400V, Sinamics G130 400V, Sinamics G130 500V, Sinamics G130 690V, Micromaster 430/440), Installed motor power (7.5 kW).
- Mechanical control of the comparative process:** Throttle control (selected), dual-speed motor, Recycling line, Variable inlet vane. A diagram shows a motor (M) connected to a fan (F) with a pressure drop Δp_f and a constant speed $n=const.$

- Fan settings
- Motor data
- Mechanical control of the comparative process
- Profile of the fan
- Selection of the typical plant
- Economic data (energy costs)
- Selection of the converter

SinaSave

© Siemens AG 2009. All rights reserved.

Industry Sector

Variable Speed Drives (Low Voltage)

Basic entries - Fans



When entering the relevant data, the value for the specific speed is checked. If this value is not plausible, then an alarm is output and the data that has been entered must be appropriately corrected.

The screenshot shows the SinaSave software interface for configuring fans. The 'Fan settings' section is highlighted with a red box, showing the following values:

| Parameter | Value | Unit |
|----------------------------------------------|-----------|-------|
| Total differential pressure Δp_{tot} | 1.00 | mbar |
| Volume Flow Q_v | 10,000.00 | m³/h |
| Rotational speed n | 2,950.00 | 1/min |
| Density of the medium ρ | 1.20 | kg/m³ |
| Specific speed n_s | 987.86 | 1/min |
| Fan capacity P_{fan} | 0.32 | kW |
| Fan efficiency $\eta_{fan,opt}$ | 87.00 | % |

The 'Profile of the fan' section shows the following data:

| Flow rate ratio in % | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|----------------------|------|------|------|------|------|------|------|------|------|------|
| Hours per day | 0.0 | 1.2 | 2.4 | 3.6 | 4.8 | 4.8 | 3.6 | 2.4 | 1.2 | 0.0 |
| Efficiency in % | 12.2 | 23.5 | 34.8 | 45.2 | 54.8 | 63.5 | 72.2 | 79.2 | 83.5 | 87.0 |

The 'Warning' dialog box states: "Warning of the typical plant: The calculated value of the specific speed lies beyond the allowed area from ≥ 8 1/min und ≤ 300 1/min. Please change the relevant input parameters." The 'Selection of the converter' section shows the following options:

| Cabinet units | Chassis units | |
|------------------------------------------|-----------------------------------------------------|------------------------------------------|
| <input type="radio"/> Sinamics G150 400V | <input checked="" type="radio"/> Sinamics G110 230V | <input type="radio"/> Sinamics G130 400V |
| <input type="radio"/> Sinamics G150 500V | <input type="radio"/> Sinamics G120 400V | <input type="radio"/> Sinamics G130 500V |
| <input type="radio"/> Sinamics G150 690V | <input type="radio"/> Micromaster 430/440 | <input type="radio"/> Sinamics G130 690V |

The 'Installed motor power' is set to 0.37 kW.

Variable Speed Drives (Low Voltage)

Advanced entries - Fans



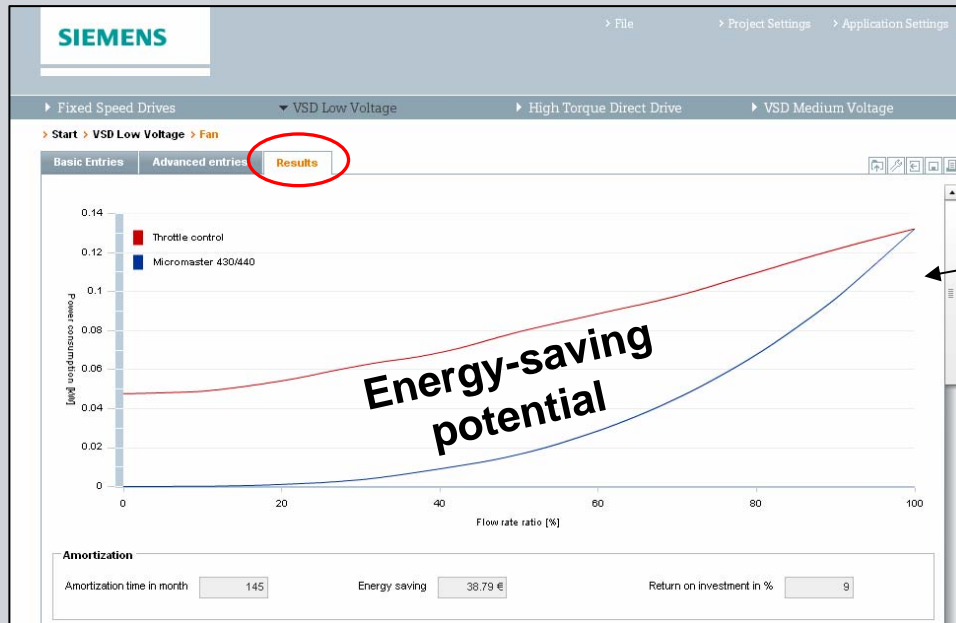
The screenshot shows the SinaSave software interface. The top navigation bar includes 'File', 'Project settings', 'Application settings', and '?'. The main menu has 'Fixed Speed Drives', 'VSD Low Voltage', 'High Torque Direct Drives', and 'VSD Medium Voltage'. The breadcrumb trail is '> Start > VSD Low Voltage > Fans'. The 'Advanced entries' tab is selected and circled in red. Below the tabs are four sections:

- Costs for infrastructure**: 'Costs for additional infrastructure' with a value of 0.00 €.
- Discount for the converter**: 'List price' (1,725.00 €), 'Discount' (0.0 %), and 'Customer price' (1,725.00 €).
- Funding**: 'Subsidies' with a value of 0.00 €.
- Additional Saving costs in % of the energy costs**: 'Saving in % of the energy cost compared with fixed speed' with three sub-entries: 'Reduced maintenance costs' (2 %), 'Saving by reduced installation- and investment costs' (2 %), and 'Additional saving by reduced energy costs' (3 %).

- **Costs for infrastructure**
- **Discount**
- **Funding/subsidies**
- **Additional cost saving**

Variable Speed Drives (Low Voltage)

Results - Fans



Results:

Graphic analysis of the entered data

Numerical analysis of the entered data

| Fan data | |
|------------------------------------|---------------------------------------------------|
| Operating data | |
| Total differential pressure | 20.00 mbar |
| Volume Flow | 10,000.00 m³/h |
| Rotational speed | 2,950.00 1/min |
| Density of the medium | 1.20 kg/m³ |
| Specific speed | 104.45 1/min |
| Power rating | 6.17 kW |
| Efficiency | 90.00 % |
| Motor data | |
| Power rating | 6.43 kW |
| Electrical motor efficiency | 96.00 % |
| Profile of the fan | |
| Flow rate ratio in % | 10 20 30 40 50 60 70 80 90 100 |
| Hours / Day | 24 |
| Hours | 0.00 1.20 2.40 3.60 4.80 4.80 3.60 2.40 1.20 0.00 |
| Efficiency | 17.1 28.8 41.4 51.3 60.3 69.3 79.2 83.7 87.3 90.0 |
| Operating time | 365 |
| Plant data | |
| Mechanical control | Throttle control |
| Dynamic / static portion in % of H | 0.0 % |
| Selection of the converter | Simatics G120 400V |
| Installed motor power | 7.50 kW |

| Costs | |
|-------------------------------------------|--------------|
| Investment costs | |
| List price | 1,030.00 € |
| Discount | 0.0 % |
| Customer price | 1,030.00 € |
| Costs for additional infrastructure | 0.00 € |
| Energy costs | |
| Energy price per kWh | 0.080 € |
| of mechanical control per year | 3,882.01 € |
| of converter per year | 994.72 € |
| Saving per year | 2,887.28 € |
| Saving per year | 74 % |
| Energy consumption | |
| of mechanical control per year | 48,525.1 kWh |
| converter per year | 12,434.0 kWh |
| Energy saving per year | 36,091.1 kWh |
| Additional energy saving | |
| Reduced maintenance costs | 77.64 € |
| Reduced installation and investment costs | 77.64 € |
| Additional saving by reduced energy costs | 116.46 € |
| Subsidies | 0.00 € |

Variable Speed Drives (Medium Voltage)

Entries - Pumps



Pump settings

| | | | |
|-----------------------|-----------------------|----------|-------|
| Pump head | H | 200.00 | m |
| Flow | Q | 1,800.00 | m³/h |
| Rotational speed | n | 2,950.00 | 1/min |
| Density of the medium | ρ | 1,000.00 | kg/m³ |
| Specific speed | n _q | 39.22 | 1/min |
| Pump capacity | P _{ump} | 1,077.65 | kW |
| Pump efficiency | η _{pump,opt} | 91.00 | % |

Motor data

| | | | |
|-----------------------|-----------------|----------|----|
| Power rating | P _{el} | 1,122.56 | kW |
| Electrical efficiency | η _{el} | 96.00 | % |

Profile of the pump

Days/Year: 365

| | | | | | | | | | | |
|----------------------|------|------|------|------|------|------|------|------|------|------|
| Flow rate ratio in % | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Hours per day | 0.0 | 0.0 | 0.0 | 0.0 | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.0 |
| Efficiency in % | 20.0 | 36.4 | 48.2 | 60.1 | 70.1 | 77.4 | 83.7 | 88.3 | 89.2 | 91.0 |

Selection of the typical plant

with static part in % of H: 50 %

dynamic part only

Economic data

Energy price per kWh: 0.160 €

Selection of the converter

Cabinet units

PERFECT HARMONY 3.3 kV

PERFECT HARMONY 4.7/4.16 kV

PERFECT HARMONY 6 kV

PERFECT HARMONY 6.6 kV

Installed motor power: 1260.65 kW

Mechanical control of the comparative process

Throttle control

Recycling line

Variable inlet vane

Schematic diagram: Motor (M) -> Pump (P) -> Valve (V) -> Pressure source (Δp). n=const.

- Fan settings
- Motor data
- Mechanical control of the comparative process
- Profile of the fan
- Selection of the typical plant
- Economic data (energy costs)
- Selection of the converter

Variable Speed Drives (Medium Voltage)

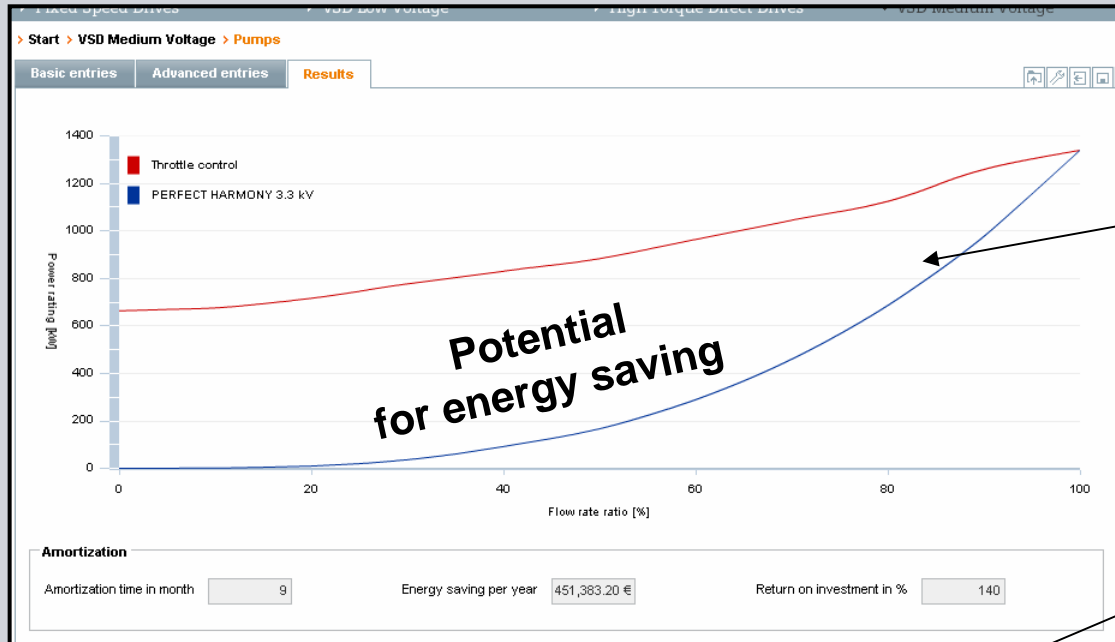
Advanced entries - Pumps



- **Costs for infrastructure**
- **Discount**
- **Funding/subsidies**
- **Additional cost savings**

Variable Speed Drives (Medium Voltage)

Results - Pumps



Results:

Graphic analysis of the entered data

Numerical analysis of the entered data

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Operating data</p> <p>Pump head: 200.00 m</p> <p>Flow: 1,800.00 m³/h</p> <p>Rotational speed: 2,950.00 1/min</p> <p>Efficiency: 91.00 %</p> <p>Density of the medium: 1,000.00 kg/m³</p> <p>Specific speed: 39.22 1/min</p> <p>Power rating: 1,077.65 kW</p> | <p>Load characteristic of the pump</p> <p>Flow rate ratio in %: 10 20 30 40 50 60 70 80 90 100</p> <p>Hours / Day: 24</p> <p>Hours: 0.00 0.00 0.00 0.00 12.00 0.00 0.00 0.00 0.00 12.00</p> <p>Efficiency: 20.0 36.4 48.2 60.1 70.1 77.4 83.7 88.3 89.2 91.0</p> <p>Operating time: 365</p> | <p>Costs</p> <p>Investment costs</p> <p>List price: 324,500.00 €</p> <p>Discount: 0.0 %</p> <p>Customer price: 324,500.00 €</p> <p>Costs for additional infrastructure: 0.00 €</p> <p>Energy costs</p> <p>Energy price per kWh: 0.080 €</p> <p>of mechanical control per year: 658,540.88 €</p> <p>of converter per year: 207,157.68 €</p> <p>Saving per year: 451,383.20 €</p> <p>Saving per year: 69 %</p> |
| <p>Motor data</p> <p>Power rating: 1,122.56 kW</p> <p>Electrical motor efficiency: 96.00 %</p> | <p>Plant data</p> <p>Mechanical control: Throttle control</p> <p>Dynamic / static portion in % of H: 50.0 %</p> <p>Selection of the converter: PERFECT HARMONY 3.3 kV</p> <p>Installed motor power: 1,260.65 kW</p> | <p>Energy consumption</p> <p>of mechanical control per year: 9,231,761.0 kWh</p> <p>converter per year: 2,589,471.0 kWh</p> <p>Energy saving per year: 5,642,290.1 kWh</p> <p>Additional energy saving</p> <p>Reduced maintenance costs: 13,170.82 €</p> <p>Reduced installation and investment costs: 13,170.82 €</p> <p>Additional saving by reduced energy costs: 19,756.23 €</p> <p>Subsidies: 0.00 €</p> |

High Torque Direct Drives

Background

SIEMENS

The “High Torque Direct Drive“ module determines potential **savings** relating to

- **Energy consumption** and
- **Operational cost**

using a High Torque Direct Drive instead of a conventional drive system with gearbox and induction motor.

HTDD also calculates

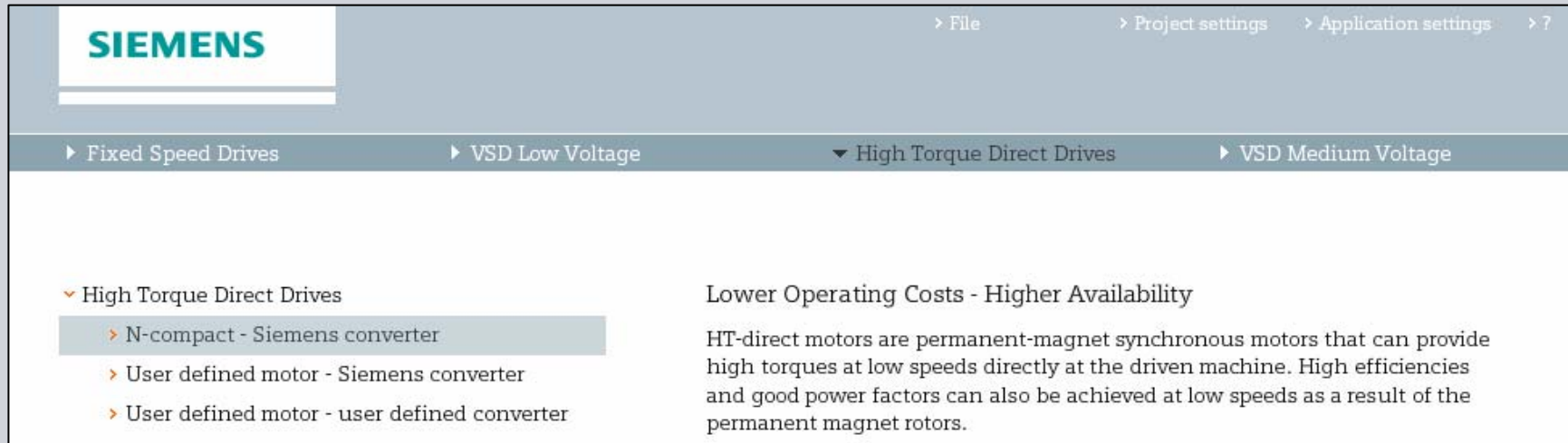
- **Investment costs** and
- **Payback time**



High Torque Direct Drives

Comparison settings

SIEMENS



SIEMENS

> File > Project settings > Application settings > ?

> Fixed Speed Drives > VSD Low Voltage > High Torque Direct Drives > VSD Medium Voltage

High Torque Direct Drives

- N-compact - Siemens converter
- User defined motor - Siemens converter
- User defined motor - user defined converter

Lower Operating Costs - Higher Availability

HT-direct motors are permanent-magnet synchronous motors that can provide high torques at low speeds directly at the driven machine. High efficiencies and good power factors can also be achieved at low speeds as a result of the permanent magnet rotors.

The “High Torque Direct Drive” module of SinaSave 4.0 contains three different comparison settings.

A drive system comprising an HT direct drive fed from a SINAMICS G150 low-voltage converter is always compared to a conventional drive system existing of gearbox – induction motor – converter.

There, users can compare the system HT-direct – SINAMICS G150 with a drive system comprising user-defined products a system comprising a user-defined-motor and Siemens converter - or a system comprising Siemens motor and Siemens converter.

The HTDD module takes into consideration air cooled systems and a 690V power supply voltage.

High Torque Direct Drives

Entries



The “Basic entries” tab is divided into three areas:

Left: The driven load (driven machine) is defined here

Center: The components of the drive system using an HT-direct motor are defined here

Right: The components of a conventional drive system using gearbox and induction motor are defined here

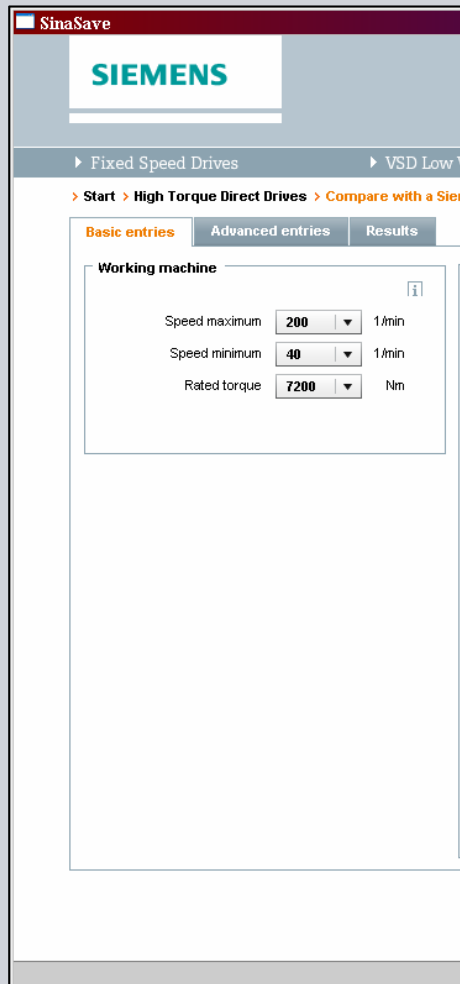
> Start > High Torque Direct Drives > Compare with a Siemens-system

Basic entries Advanced entries Results

| Working machine | HT-direct – SINAMICS G150 | gearbox – N-compact – SINAMICS G150 |
|--------------------------|----------------------------------|-------------------------------------|
| Speed maximum: 200 1/min | Coupling HT-direct-load: 1,200 € | Coupling gearbox - load: 1,200 € |
| Speed minimum: 40 1/min | Savings basement: 2,480 € | Gear efficiency: 96.0 % |
| Rated torque: 7200 Nm | | Transmission ratio i: 1:7.4 |
| | | Customer price gear: 12,400 € |
| | | Coupling motor – gear: 300 € |
| | HT-direct | Induction motor |
| | 1FW4401-3HA70-1AA0 | 1PQ83154PM80 |
| | Rated power: 150 kW | Rated power: 235 kW |
| | Efficiency at full load: 95.4 % | Efficiency: 95.5 % |
| | Required current: 140 A | Required current: 178 A |
| | Customer price: 38,155 € | Customer price: 23,360 € |
| | SINAMICS G150 | SINAMICS G150 |
| | 6SL3710-1GH31-8AA0 | 6SL3710-1GH32-2AA0 |
| | Efficiency: 97.9 % | Efficiency: 97.7 % |
| | Customer price: 9,975 € | Customer price: 12,075 € |
| | System efficiency: 93.4 % | System efficiency: 89.6 % |
| | Total investment: 46,850 € | Total investment: 49,335 € |

High Torque Direct Drives

Entries - defining the load



The first step is to define the load.

For this purpose, a driven load with a constant load torque is used as basis. This means that the selected torque is available over the complete speed setting range (minimum speed up to maximum speed).

All comparison scenarios use this step in the same way.

| SINAMICS DTM | | SINAMICS DTU | |
|--------------------------|----------|--------------------------|----------|
| Customer price excl. tax | 1,200 € | Customer price excl. tax | 1,200 € |
| Service lifetime | 2,000 h | Gear efficiency | 95.0 % |
| | | Temperature index | 1.0 |
| | | Customer price excl. tax | 12,000 € |
| | | Customer price excl. tax | 500 € |
| HT-drive | | automation module | |
| Customer price excl. tax | 1,000 € | 110001040000 | € |
| Rated power | 1.11 kW | Rated power | 1.11 kW |
| Efficiency at full load | 90.0 % | Efficiency | 95.0 % |
| Required current | 1.91 A | Required current | 1.76 A |
| Customer price | 58,150 € | Customer price | 55,800 € |
| SINAMICS DTU | | SINAMICS DTU | |
| Customer price excl. tax | 1,000 € | 60,1716-11410-1A40 | |
| Efficiency | 90.0 % | Efficiency | 97.7 % |
| Customer price | 8,075 € | Customer price | 12,775 € |
| System efficiency | 90.0 % | System efficiency | 97.0 % |
| Total investment | 48,650 € | Total investment | 40,100 € |

High Torque Direct Drives

Entries - defining the HT-direct drive system



> Start > High Torque Direct Drives > Compare with a Siemens-system

Basic entries | Advanced entries | Results

Working machine

Speed maximum: 200 1/min

Speed minimum: 40 1/min

Rated torque: 7200 Nm

HT-direct – SINAMICS G150

Coupling HT-direct-load: 1,200 €

Savings basement: 2,480 €

HT-direct

1FW4401-3HA70-1AA0

Rated power: 150 kW

Efficiency at full load: 95.4 %

Required current: 140 A

Customer price: 38,155 €

SINAMICS G150

6SL3710-1GH31-8AA0

Efficiency: 97.9 %

Customer price: 9,975 €

System efficiency: 93.4 %

Total investment: 46,850 €

Gear

Coupling gearbox - load: 1,200 €

Gear efficiency: 95.0 %

Transmission ratio i: 1.74

Customer price gear: 12,400 €

Required current: 178 A

Customer price: 23,360 €

Total investment: 49,335 €

After defining the load, the components of the HT-direct drive system are automatically selected by SinaSave and the associated technical data and customer prices are displayed in the associated fields.

All of the prices that are shown are estimated customer prices. The values in this field can be exceeded - which allows the user to adapt to the individual situation.

The "Savings basis" is a cost advantage and will be subtracted from the "Total investment".

The value in this data field can be exceeded.

Due to the fact that SinaSave applies an efficiency derating according to the degree of converter utilization (I/I_R) it is possible that the SINAMICS G150 efficiency - which is displayed - differs from the value listed in the catalog.

High Torque Direct Drives



Entries - defining a drive system comprising gearbox and induction motor

> Start > High Torque Direct Drives > Compare with a Siemens system

The differences between the three comparative scenarios is again shown in this area.

However, the basic configuration – with coupling – gear unit – coupling – motor – drive converter is however the same for all of the scenarios. The differences lie in the motor and drive converter components.

For the scenario “**N-compact – Siemens drive converter**”, after defining the drive train, all of the fields are automatically filled. The prices are pre-assigned analog to the systemology applied for the HT-direct drive train.

This scenario allows users to either select a 4-, 6- or 8-pole force-ventilated Siemens induction motor. The gear unit ratio is automatically adapted the same as the values of the drive converter.

The efficiencies of motor and converter are adjusted to the degree of utilization.

| SINAMICS G150 | |
|--------------------|----------------------------|
| 6SL3710-1GH31-8AA0 | i |
| Efficiency | 97.9 % i |
| Customer price | 9,975 € i |
| System efficiency | 93.4 % i |
| Total investment | 46,850 € i |

| gearbox – N-compact – SINAMICS G150 | |
|-------------------------------------|----------------------------|
| Gear | |
| Coupling gearbox - load | 1,200 € i |
| Gear efficiency | 96.0 % i |
| Transmission ratio i | 1:7.4 i |
| Customer price gear | 12,400 € i |
| Coupling motor – gear | 300 € i |
| Induction motor | |
| 1PQ83154PM80 | i |
| Rated power | 235 kW i |
| Efficiency | 95.5 % i |
| Required current | 178 A i |
| Customer price | 23,360 € i |
| SINAMICS G150 | |
| 6SL3710-1GH32-2AA0 | i |
| Efficiency | 97.7 % i |
| Customer price | 12,075 € i |
| System efficiency | 89.6 % i |
| Total investment | 49,335 € i |

High Torque Direct Drives



Entries - defining a drive system comprising gearbox and induction motor

> Start > High Torque Direct Drives > Compare with user-defined motor on Siemens converter

Also for the scenario “**user-defined motor – Siemens converter**”, after defining the drive train, the data blocks for the gear unit and drive converter are filled. The fields for the motor data should only be considered as a space retainer. The **catalog values** of a matching induction motor must be entered into these fields.

The gear unit and converter data are automatically adapted.

The prices are pre-assigned according to the schematic already described.

The efficiencies of the motor and converter are adapted to the degree of utilization. This is the reason why the value of “system efficiency” is not the product of the individual efficiencies that are displayed.

The efficiency of motor is reduced based on the catalog value according to the degree of utilization.

| SINAMICS G150 | |
|-------------------|--------------------|
| | 6SL3710-1GH31-2AA0 |
| Efficiency | 97.9 % |
| Customer price | 9,975 € |
| System efficiency | 93.4 % |
| Total investment | 46,650 € |

| gearbox – user-defined motor – SINAMICS G150 | |
|----------------------------------------------|--------------------|
| Gear | |
| Coupling gearbox - load | 1,200 € |
| Gear efficiency | 96.0 % |
| Transmission ratio i | 1:7.4 |
| Customer price gear | 12,400 € |
| Coupling motor – gear | 300 € |
| Induction motor | |
| Motor name | |
| Rated power | 235 kW |
| Rated speed | 1,485 1/min |
| Efficiency | 95.8 % |
| Cos φ | 0.87 |
| Customer price | 0 € |
| SINAMICS G150 | |
| | 6SL3710-1GH32-2AA0 |
| Efficiency | 97.7 % |
| Customer price | 12,075 € |
| System efficiency | 89.6 % |
| Total investment | 25,975 € |

High Torque Direct Drives



Entries - defining a drive system comprising gearbox and induction motor

> Start > High Torque Direct Drives > Compare with user-defined-motor on user-defined-converter

The default values shown in the data blocks of the motor and gear unit should initially be considered as space retainer in the scenario “**user-defined motor – user-defined converter**”. The catalog values of a suitable motor and drive converter must be entered into these data blocks.

In this case, as well, the value “system efficiency” is not the product of the individual efficiencies that are shown.

The efficiency of the motor and converter were reduced based on the catalog value according to the degree of utilization.

| | | | |
|-------------------------|--------------------|----|---|
| Rated power | 150 | kW | i |
| Efficiency at full load | 95.4 | % | i |
| Required current | 140 | A | i |
| Customer price | 38,155 | € | i |
| SINAMICS G150 | | | |
| | 6SL3710-1GH31-8AA0 | | i |
| Efficiency | 97.9 | % | i |
| Customer price | 9,975 | € | i |
| System efficiency | 93.4 | % | i |
| Total investment | 46,850 | € | i |

| | | | |
|---------------------------------------------------|--------|-------|---|
| gearbox – user-defined motor – user-defined conve | | | |
| Gear | | | |
| Coupling gearbox - load | 1,200 | € | i |
| Gear efficiency | 96.0 | % | i |
| Transmission ratio i | 1:7.4 | | i |
| Customer price gear | 12,400 | € | i |
| Coupling motor – gear | 300 | € | i |
| Induction motor | | | |
| Motor name | | | i |
| Rated power | 235 | kW | i |
| Rated speed | 1,485 | 1/min | i |
| Efficiency | 95.8 | % | i |
| Cos φ | 0.87 | | i |
| Customer price | 0 | € | i |
| User defined converter | | | |
| Rated current (690 V) | 215 | | i |
| Efficiency | 97.8 | % | i |
| Customer price | 0 | € | i |
| System efficiency | 89.6 | % | i |
| Total investment | 13,900 | € | i |

High Torque Direct Drives



Entries - defining a drive system comprising gearbox and induction motor

If a motor or drive converter that is under-dimensioned is entered, then a popup window indicates the required minimum power rating or the required minimum rated current.

Working machine

| | | |
|---------------|------|-------|
| Speed maximum | 200 | 1/min |
| Speed minimum | 40 | 1/min |
| Rated torque | 7200 | Nm |

HT-direct - SINAMICS G150

| | |
|-------------------------|---------|
| Coupling HT-direct-load | 1,200 € |
| Savings basement | 2,400 € |

Rated current

The rated current value must be at least 178 A.

OK

SINAMICS G150

| | |
|--------------------|----------|
| 6SL3710-1GH31-8AA0 | |
| Efficiency | 97.9 % |
| Customer price | 9,975 € |
| System efficiency | 93.4 % |
| Total investment | 46,850 € |

gearbox - user-defined motor - user-defined conve

Gear

| | |
|-------------------------|----------|
| Coupling gearbox - load | 1,200 € |
| Gear efficiency | 96.0 % |
| Transmission ratio i | 1:7.4 |
| Customer price gear | 12,400 € |
| Coupling motor - gear | 300 € |

Induction motor

| | |
|----------------|-------------|
| Motor name | |
| Rated power | 235 kW |
| Rated speed | 1,485 1/min |
| Efficiency | 95.8 % |
| Cos φ | 0.87 |
| Customer price | 0 € |

User defined converter

| | |
|-----------------------|----------|
| Rated current (690 V) | 23 |
| Efficiency | 97.8 % |
| Customer price | 0 € |
| System efficiency | 90.0 % |
| Total investment | 13,900 € |

High Torque Direct Drives

Advanced entries



> Start > High Torque Direct Drives > Compare with a Siemens-system

Basic entries **Advanced entries** Results

Operation characteristic

Days/Year

Energy price per kWh

Speed in % 20 30 40 50 60 70 80 90 100

Speed in rpm

Operating time in h/d

Operating time in %/d

Saving operating expenses

Saving operating expenses gearbox (Oil, Service, etc.)

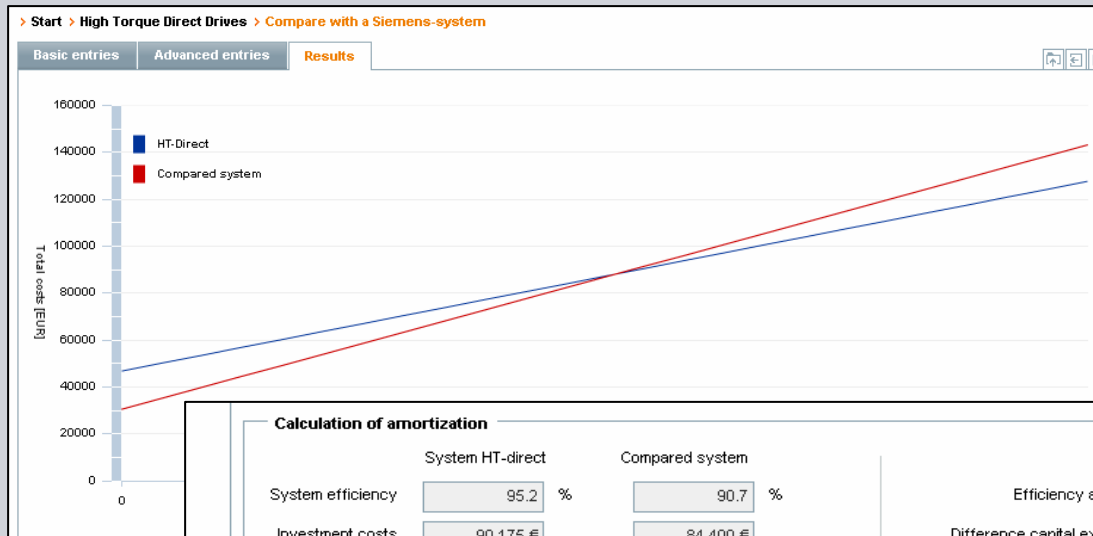
as a percentage of the gear price per year %

as amount per year

The number of hours per day and the number of days per year that the driven load is operated at the various speeds must be entered under “Operation characteristic”.

The value “Savings operating expenses” represents the annual cost for service and spare parts as a result of the gearbox. The value first entered into the field depends on the gear unit size and can be naturally exceeded.

High Torque Direct Drives Results



Calculation of amortization

| | System HT-direct | Compared system | | System distinction |
|-------------------|------------------|-----------------|---------------------------------|--------------------------|
| System efficiency | 95.2 % | 90.7 % | Efficiency advantage | 4.5 % |
| Investment costs | 90,175 € | 84,400 € | Difference capital expenditure | 5,775 € |
| Energy demand | 720,776 kWh/a | 932,837 kWh/a | Betriebskostensparnis | 900 € |
| Energy costs p.a. | 57,662 € | 74,627 € | Saving of energy costs per year | 16,965 € |
| | | | Point of amortization | 3.88 months 0.32 years |

Compared system

Gear

| | |
|----------------------|---------|
| Coupler gearbox-load | 1,200 € |
| Gear efficiency | 96.0 % |
| Transmission ratio i | 1:7.4 |
| Customer price gear | 8,000 € |
| Coupler motor-gear | 300 € |

Asynchronous motor

| | |
|----------------|--------------|
| Motor name | 1PQ83154PM80 |
| Rated power | 235 kW |
| Rated speed | 1,485 1/min |
| Efficiency | 95.6 % |
| Cos φ | 0.87 |
| Customer price | 23,360 € |

SINAMICS G150

| | |
|--------------------|---------|
| 6SL3710-1GH31-8AA0 | |
| Efficiency | 97.9 % |
| Customer price | 9,975 € |

SINAMICS G150

| | |
|--------------------|----------|
| 6SL3710-1GH32-6AA0 | |
| Efficiency | 97.5 % |
| Customer price | 12,075 € |

System efficiency: 89.5 %
Total investment: 30,500 €

The “results” tab contains a graphic representation of the breakeven point as well as numerical listing of the system differences regarding efficiency, cost of investment and energy costs.

This is followed by the data of the systems for which the values have been calculated under the “Entries” and “Advanced entries” tabs.

Exercise

- Fixed Speed Drives -

Exercise 1:

How long is the payback time (in hours) for an EFF1 motor in comparison to an EFF2 motor with the following technical data?

- 15 kW
- Pole number 4
- Material: Aluminum
- Motor load 4/4
- Shift 4000 hours
- Energy costs 0,12 €/kWh
- Customer discount 50%

Exercise

- Fixed Speed Drives -

Results:

Calculation of amortization

| | | | |
|-----------------------------------|---------------------------------------|------------------------------|---------------------------------------|
| Number of motors | <input type="text" value="1"/> | Saving per year in kWh | <input type="text" value="1,896.70"/> |
| Payback period in operation hours | <input type="text" value="7,117.62"/> | Saving costs per year in EUR | <input type="text" value="227.60 €"/> |

EFF1 vs. EFF2

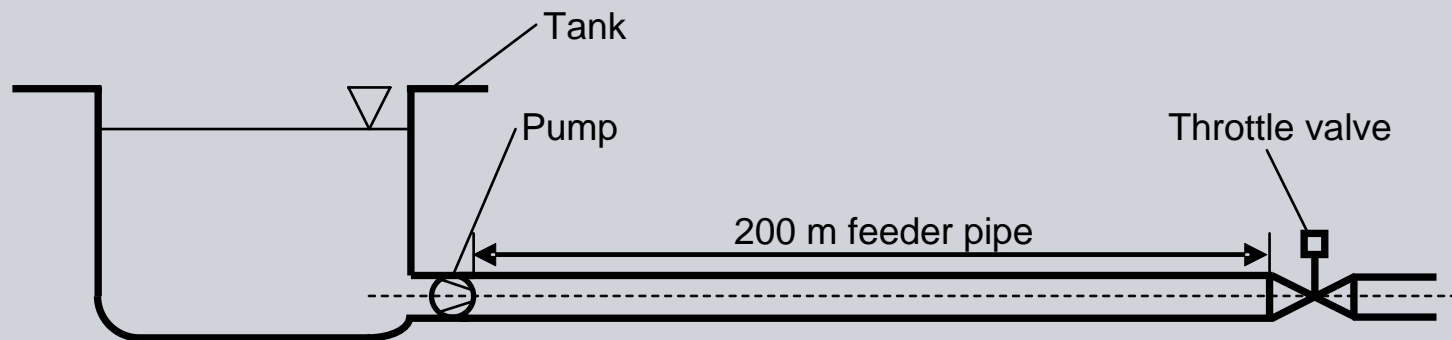
| | EFF1 | EFF2 |
|-------------------------------------------|--------------------|--------------------|
| Motor designation | 1LE1001-1DB4-..... | 1LE1002-1DB4-..... |
| Motor power rating in kW | 15.00 | 15.00 |
| Number poles | 4 | 4 |
| Frame material | Aluminium | Aluminium |
| Motor load | 1 | 1 |
| Operating hours per year | 4,000.00 | 4,000.00 |
| Efficiency in % | 92.00 | 89.40 |
| Energy price per kWh | 0.120 € | 0.120 € |
| Energy consumption per year in kWh | 65,217.39 | 67,114.09 |
| Energy costs per year | 7,826.09 € | 8,053.69 € |
| List price | 3,130.00 € | 2,320.00 € |
| Customer discount in % | 50.00 | 50.00 |
| Customer price | 1,565.00 € | 1,160.00 € |

Exercise

- Variable Speed Drives (low voltage) -

Exercise 2:

In a large chemical plant, a nitric acid solution is pumped through a long piping system as shown in the diagram below.



| | | |
|--------|-----------------------------------------------|--------------------------------|
| Given: | Flow rate in operating state 1: | 1800 m ³ /h |
| | Resulting pressure loss in the pipe: | 10 bar = 100 m delivery height |
| | Flow rate in operating state 2: | 900 m ³ /h |
| | Specific gravity of the nitric acid solution: | 1068 kg/m ³ |

Exercise

- Variable Speed Drives (low voltage) -

Exercise 2:

The plant essentially comprises a tank to which a 200 m long horizontal steel pipe is connected – as well as a pump and a throttle, which are installed in the pipe. The pump has been dimensioned so that it operates at its optimum at operating point 1. Operating point 2 corresponds to a 50% pumping rate and this is adjusted using a throttle valve. The pump is operated 12 hours/per day at operating point 1 – and 12 hours/per day at operating point 2. Using Sinasave, the energy saving that can be expected when using a frequency converter is now calculated.

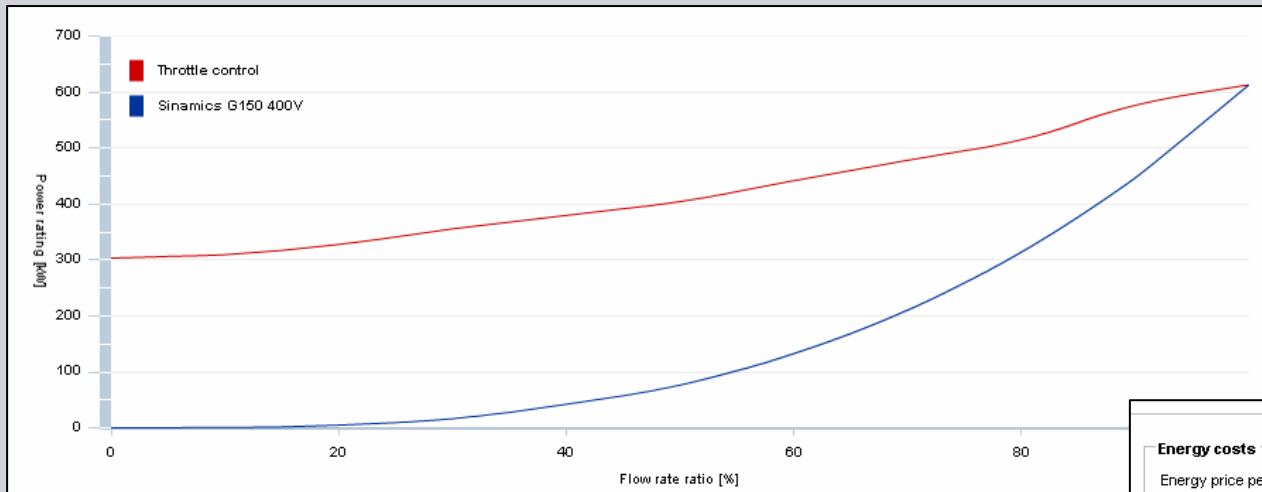
The following values are obtained for the base settings (refer to the diagram):

- Flow rate and delivery height of the pumps at the optimum operating point (1800 m³/h / 100 m)
- Specific gravity of the fluid/liquid being pumped (1068 kg/m³)
- Operating hours per operating point per day (12 h, 100% flow rate, 12 h, 50 % flow rate)
- Power costs per kWh (0.08 Euro/kWh)
- Discount for the drive converter: (25%)

Exercise

- Variable Speed Drives (low voltage) -

Results 2:



| Costs | |
|-------------------------------------|-----------------|
| Investment costs | |
| List price | 49,100.00 € |
| Discount | 25.0 % |
| Customer price | 36,825.00 € |
| Costs for additional infrastructure | |
| | 0.00 € |
| Energy consumption | |
| of mechanical control per year | 4,456,386.9 kWh |
| converter per year | 3,020,141.7 kWh |
| Energy saving per year | 1,436,245.2 kWh |

| Amortization | | | |
|----------------------------------------|--------------------|---------------------------|--------------|
| Amortization time in months | 4 | Energy saving per year | 114,899.61 € |
| | | Return on investment in % | 313 |
| Pump data | | | |
| Operating data | | | |
| Pump head | 100.00 m | | |
| Flow | 1,800.00 m³/h | | |
| Rotational speed | 2,950.00 1/min | | |
| Density of the medium | 1,068.00 kg/m³ | | |
| Specific speed | 65.96 1/min | | |
| Power rating | 588.40 kW | | |
| Efficiency | 89.00 % | | |
| Load characteristic of the pump | | | |
| Flow rate ratio in % | 10 | 20 | 30 |
| Hours / Day | 24 | | |
| Hours | 0.00 | 0.00 | 0.00 |
| Efficiency | 19.6 | 32.9 | 44.5 |
| Operating time | 365 | | |
| Motor data | | | |
| Power rating | 612.92 kW | | |
| Electrical motor efficiency | 96.00 % | | |
| Plant data | | | |
| Mechanical control | Throttle control | | |
| Dynamic / static portion in % of H | 0.0 % | | |
| Selection of the converter | Sinamics G150 400V | | |
| Installed motor power | 630.00 kW | | |

| Energy costs | |
|--------------------------------|--------------|
| Energy price per kWh | 0.080 € |
| of mechanical control per year | 356,510.95 € |
| of converter per year | 241,611.34 € |
| Saving per year | 114,899.61 € |
| Saving per year | 32 % |

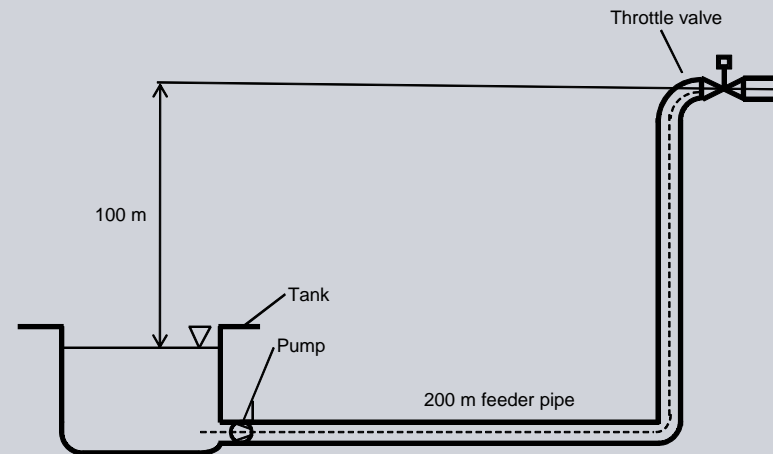
| Additional energy saving | |
|-------------------------------------------|-------------|
| Reduced maintenance costs | 7,130.22 € |
| Reduced installation and investment costs | 7,130.22 € |
| Additional saving by reduced energy costs | 10,695.33 € |
| Subsidies | 0.00 € |

Exercise

- Operating type, Variable Speed Drives (medium voltage) -

Exercise 3:

A factory is supplied with water as shown in the diagram below.



| | | |
|--------|--------------------------------------|--------------------------------|
| Given: | Flow rate in operating state 1: | 1800 m ³ /h |
| | Resulting pressure loss in the pipe: | 10 bar = 100 m delivery height |
| | Flow rate in operating state 2: | 900 m ³ /h |
| | Specific gravity of water: | 1000 kg/m ³ |
| | Discount for the drive converter: | 25% |

Exercise

- Operating type, Variable Speed Drives (medium voltage) -

Exercise 3:

The plant essentially comprises a reservoir, to which a 200 m long pipe is connected. This pipe initially runs horizontally and then vertically upwards to the factory. A pump and a throttle valve are installed in the pipe. The pump is dimensioned so that at operating point 1 it operates at its optimum. Operating point 2 corresponds to a 50% flow rate and is adjusted using a throttle valve. The pump is operated 12 h per day at operating point 1 and 12 h/per day at operating point 2. The energy saving is calculated, which can be expected when using a frequency converter in the following.

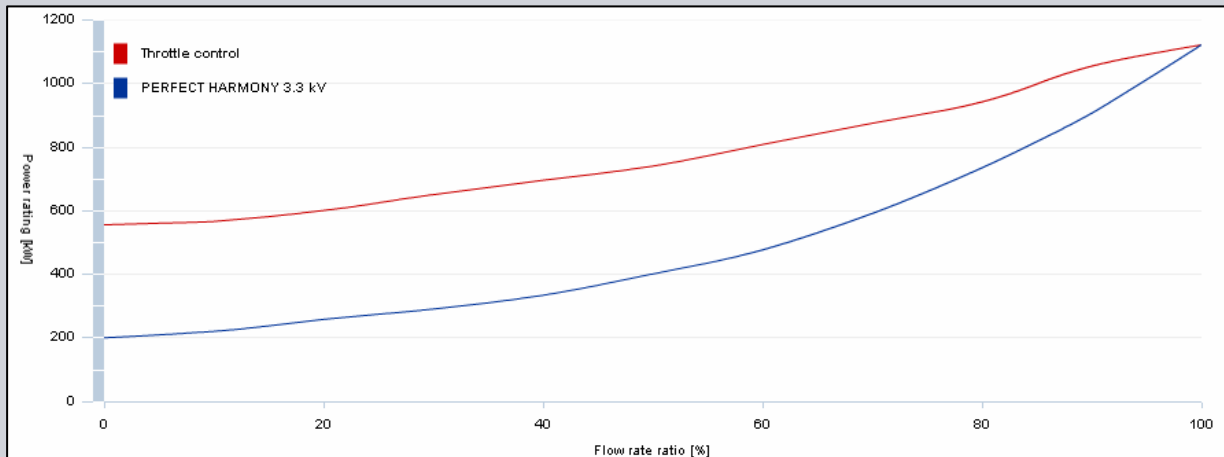
The following values are obtained for the base settings (refer to the diagram):

- Flow rate and delivery height of the pump at the optimum operating point (1800 m³/h / 200 m)
- Speed (2950 rpm)
- Specific gravity of the medium (1000 kg/m³)
- Operating hours per operating point per day (12 h, 100% flow rate, 12 h, 50 % flow rate)
- Energy costs per kWh (0.16 Euro/kWh)
- Discount for the drive converter: (25%)
- Selection of the typical system with a static component of H: 50 %

Exercise

- Variable Speed Drives (low voltage) -

Results 3:



| Costs | |
|-------------------------------------|-----------------|
| Investment costs | |
| List price | 253,900.00 € |
| Discount | 25.0 % |
| Customer price | 190,425.00 € |
| Costs for additional infrastructure | |
| | 0.00 € |
| Energy consumption | |
| of mechanical control per year | 8,161,880.8 kWh |
| converter per year | 6,672,091.7 kWh |
| Energy saving per year | 1,489,789.1 kWh |

| Amortization | |
|----------------------------------------|-----------------------------------------------------|
| Amortization time in months | 10 |
| Energy saving per year | 238,366.25 € |
| Return on investment in % | 126 |
| Pump data | |
| Operating data | |
| Pump head | 200.00 m |
| Flow | 1,800.00 m³/h |
| Rotational speed | 2,950.00 1/min |
| Efficiency | 91.00 % |
| Density of the medium | 1,000.00 kg/m³ |
| Specific speed | 39.22 1/min |
| Power rating | 1,077.65 kW |
| Load characteristic of the pump | |
| Flow rate ratio in % | 10 20 30 40 50 60 70 80 90 100 |
| Hours / Day | 24 |
| Hours | 0.00 0.00 0.00 0.00 12.00 0.00 0.00 0.00 0.00 12.00 |
| Efficiency | 20.0 36.4 48.2 60.1 70.1 77.4 83.7 88.3 89.2 91.0 |
| Operating time | 365 |
| Motor data | |
| Power rating | 1,122.56 kW |
| Electrical motor efficiency | 96.00 % |
| Plant data | |
| Mechanical control | Throttle control |
| Dynamic / static portion in % of H | 50.0 % |
| Selection of the converter | PERFECT HARMONY 3.3 kV |
| Installed motor power | 1,260.65 kW |

| Energy costs | |
|-------------------------------------------|----------------|
| Energy price per kWh | 0.160 € |
| of mechanical control per year | 1,305,900.93 € |
| of converter per year | 1,067,534.68 € |
| Saving per year | 238,366.25 € |
| Saving per year | 18 % |
| Additional energy saving | |
| Reduced maintenance costs | 26,118.02 € |
| Reduced installation and investment costs | 26,118.02 € |
| Additional saving by reduced energy costs | 39,177.03 € |
| Subsidies | 0.00 € |

Exercise

- Variable Speed Drives (low voltage) -

Results 3:

The characteristics graphically show (as difference between the red and blue lines) the different energy demand as a function of the flow rate. It can be clearly seen that the savings increase, the further the flow rate deviates from the optimum (100%).

For the plant being investigated here, the frequency converter payback time is just 10 months and that for an electricity price of 0.16 Euro per kilowatt hour. The higher the price of electricity, the faster the investment costs are paid back and the more profitable operation is with a frequency converter.

Exercise

- High Torque Direct Drives - (new plant)

Exercise 4:

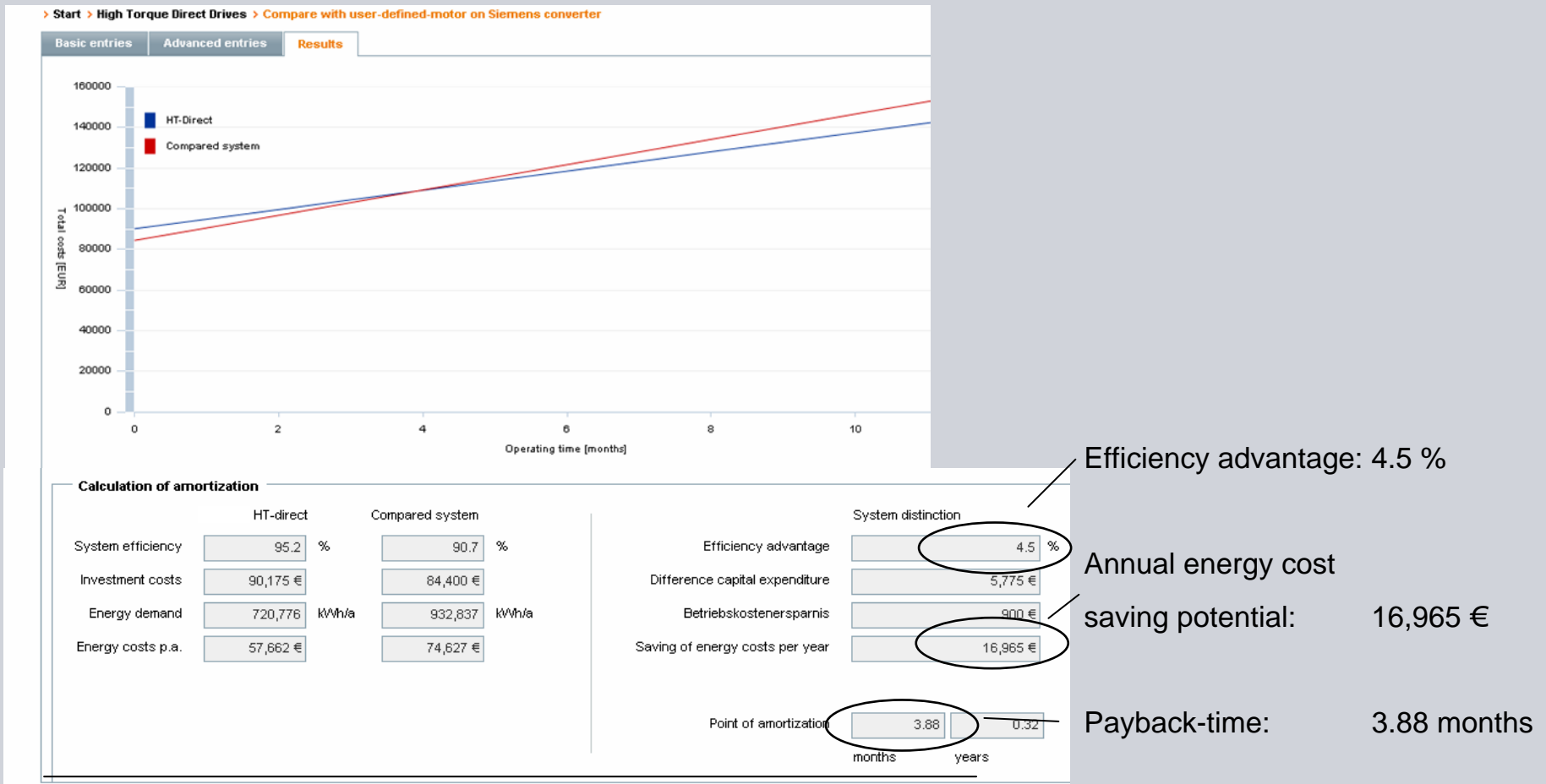
What is the efficiency advantage and the annual energy cost saving potential and how long is the payback time under the following conditions ?

| | |
|-------------------------------------|-------------------------------------------------------------------------------------|
| Torque: | 10.8 kNm (constant) |
| Speed: | 160 to 400 rpm |
| Savings for the foundation: | 0€ |
| Customer price gearbox: | 9000€ |
| Third-party motor and SINAMICS G150 | |
| Rated power | 545 kW |
| Rated speed | 1491 rpm |
| Efficiency (catalog) | 96.5 % |
| Power factor (catalog) | 0.88 |
| Customer price | 40,000€ |
| Operating days/year: | 200 |
| Operating time: | 2.00h/d in each case for 160, 200, 240, 280, 360 and 400 rpm 4.00h/d for 320 rpm |
| Operating cost savings: | 10% of customer price gearbox |

Exercise

- High Torque Direct Drives - (new plant)

Results 4:



Exercise

- High Torque Direct Drives - (plant modernization)

Exercise 5:

How long is the payback time for plant modernization?

| | |
|---------|---------------------|
| Torque: | 11.2 kNm (constant) |
| Speed: | 180 to 600 rpm |

Gear unit

| | |
|-----------------------------|-------|
| Savings for the foundation: | 0€ |
| Coupling, gearbox- load: | 0 € |
| Customer price gearbox: | 0 € |
| Coupling, motor-gearbox: | 0 € |
| Operating costs per year | 2000€ |

Third-party motor

| | |
|------------------------|----------|
| Rated power | 880 kW |
| Rated speed | 1489 rpm |
| Efficiency (catalog) | 96.5 % |
| Power factor (catalog) | 0.86 |
| Customer price | 0 € |

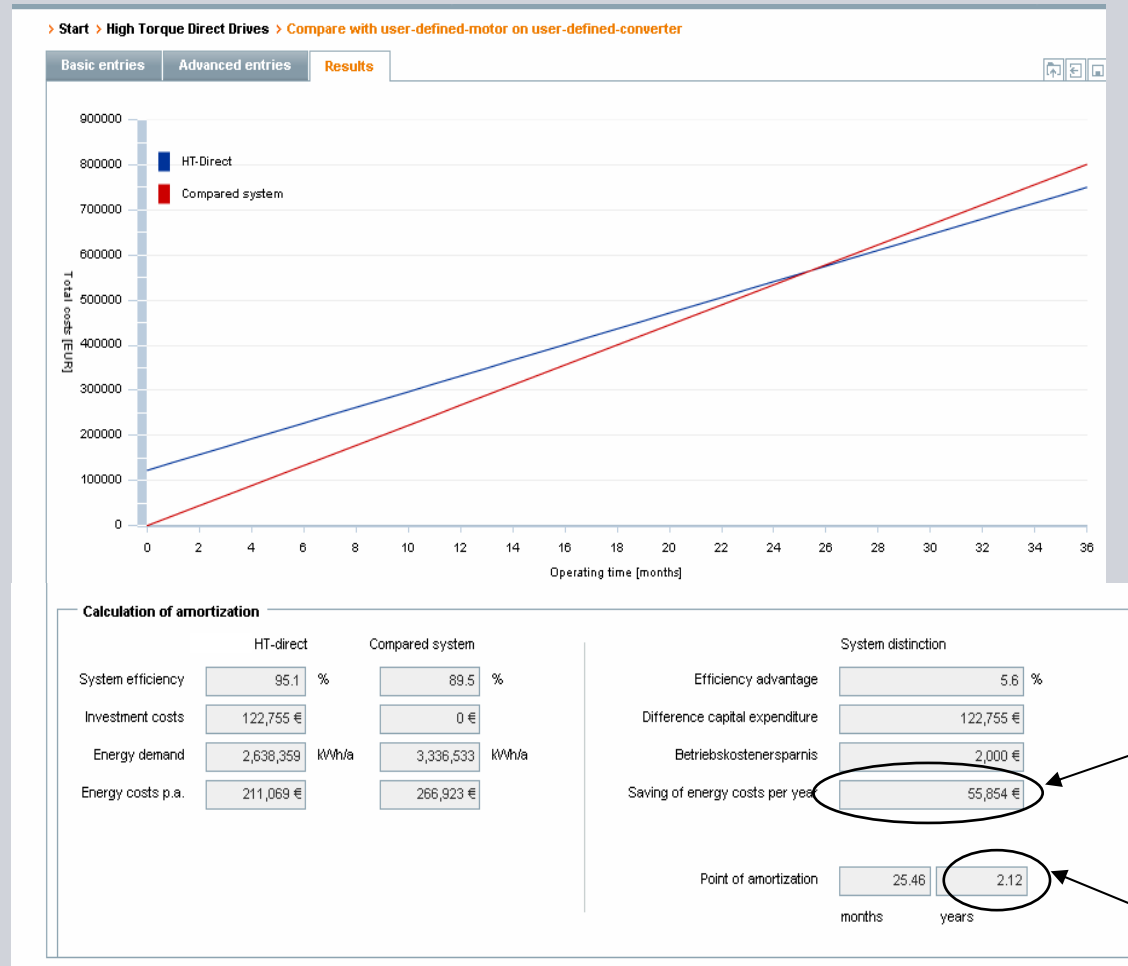
Third-party converter

| | |
|----------------------|--------|
| Rated current | 1050 A |
| Efficiency (catalog) | 96.8 % |
| Customer price | 0 € |

Exercise

- High Torque Direct Drives - (plant modernization)

Results 5:



Annual energy cost saving potential: 55,854 €

Payback time: 2.12 years

Links

Downloads:

SinaSave 4.0: <http://www.siemens.com/sinasave>

Training slide – How to use SinaSave 4.0: <http://www.siemens.com/sinasave>

Website:

Energy saving: <http://www.siemens.com/energysaving>

Portfolio Motors and Converters:

Low- voltage-motors: <http://www.siemens.com/low-voltage-motors>

AC-converters: http://www.automation.siemens.com/_en/portal/html/products/products_ac-converters.htm

AC-motors: http://www.automation.siemens.com/_en/portal/html/products/products_ac-motors.htm