

**Technical Data Sheet for AvK-Alternators**

FM 7.3-5

|              |          |                |                            |
|--------------|----------|----------------|----------------------------|
| Date:        | 02/01/14 | Customer:      | GENERIC DATASHEET only     |
| Project No.: |          | AvK Reference: | dsg074m1_6_60_690_A048M968 |

**Object data:**

|              |                        |               |  |
|--------------|------------------------|---------------|--|
| Site:        |                        | Prime Mover:  |  |
| Application: | Stationary Power Plant | Manufacturer: |  |

**Generator data:**

|                 |             |         |         |   |           |
|-----------------|-------------|---------|---------|---|-----------|
| Generator:      | DSG 74 M1/6 | Poles:  | 6       | Standards:  | IEC 60034 |
| Rated power:    | 900 kVA     | 720 kWe | 760 kWm |   |           |
| Power factor:   | 0.80        |         |         |   |           |
| Power at pf 1,0 | 732 kVA     | 732 kWe | 760 kWm |   |           |
| Rated voltage:  | 0.69 kV     |         |         |   |           |
| Speed:          | 1200 1/min  |         |         |   |           |
| Frequency:      | 60 Hz       |         |         | Voltage range / frequency range:                      |           |
| Rated current:  | 753.1 A     |         |         | Zone A according IEC 60034-1 (dU = +/-5%, df = +/-2%) |           |

|                |         |
|----------------|---------|
| Winding pitch: | ca. 5/6 |
|----------------|---------|

|                   |                 |                |                   |   |
|-------------------|-----------------|----------------|-------------------|---|
| Insulation class: | Stator: Class H | Rotor: Class H | Temperature rise: | H |
|-------------------|-----------------|----------------|-------------------|---|

|                      |        |              |                      |
|----------------------|--------|--------------|----------------------|
| Ambient temperature: | 40 ° C | Environment: | Standard environment |
|----------------------|--------|--------------|----------------------|

|                |        |  |  |
|----------------|--------|--|--|
| Site altitude: | 1000 m |  |  |
|----------------|--------|--|--|

|            |      |         |  |
|------------|------|---------|--|
| Enclosure: | IP23 | Filter: |  |
|------------|------|---------|--|

|          |                                  |
|----------|----------------------------------|
| Cooling: | IC 01 - Open-circuit ventilation |
|----------|----------------------------------|

|          |             |             |        |                       |        |
|----------|-------------|-------------|--------|-----------------------|--------|
| Coolant: | Ambient Air | Temperature | 40 ° C | Temperature Air inlet | 40 ° C |
|          |             | Coolant:    |        | generator:            |        |

|  |  |                   |          |                         |     |
|--|--|-------------------|----------|-------------------------|-----|
|  |  | Cooling air vol.: | 1.9 m³/s | Cooling water quantity: | n/a |
|--|--|-------------------|----------|-------------------------|-----|

|                        |           |         |         |                       |       |
|------------------------|-----------|---------|---------|-----------------------|-------|
| Moment of inertia (I): | 36.9 kgm² | Weight: | 3000 Kg | Losses (environment): | 40 KW |
|------------------------|-----------|---------|---------|-----------------------|-------|

|  |  |                   |     |
|--|--|-------------------|-----|
|  |  | Losses (cooling): | n/a |
|--|--|-------------------|-----|

|        |  |
|--------|--|
| Wires: | 4 terminals, starpoint connected in terminal box |
|--------|--|

|                 |             |
|-----------------|-------------|
| Operation mode: | Single mode |
|-----------------|-------------|

|             |  |
|-------------|--|
| Regulators: |  |
|-------------|--|

|                    |          |
|--------------------|----------|
| Voltage regulator: | DECS 100 |
|--------------------|----------|

**Electrical data: (acc. IEC)**

|                  |       |       |       |       |       |
|------------------|-------|-------|-------|-------|-------|
| Efficiencies:    | 110%  | 100%  | 75%   | 50%   | 25%   |
| Power factor 0.8 | 94,53 | 94,79 | 95,13 | 95,01 | 92,99 |
| Power factor 0.9 | 95,33 | 95,55 | 95,74 | 95,46 | 93,26 |
| Power factor 1.0 | 96,12 | 96,3  | 96,34 | 95,9  | 93,53 |

**Reactances and time constants**

|                  | unsaturated | saturated  |                  | unsaturated | saturated  |                  |           |                   |           |  |
|------------------|-------------|------------|------------------|-------------|------------|------------------|-----------|-------------------|-----------|--|
| X <sub>d</sub>   | 2.41        | 2.17 p.u.  | X <sub>q</sub>   | 1.12        | 1.10 p.u.  | T <sub>d0'</sub> | 2.36846 s | T <sub>d0''</sub> | 0.02553 s |  |
| X <sub>d'</sub>  | 0.291       | 0.291 p.u. | X <sub>q'</sub>  | 1.12        | 1.10 p.u.  | T <sub>d'</sub>  | 0.29 s    | T <sub>q0'</sub>  | 0.2614 s  |  |
| X <sub>d''</sub> | 0.164       | 0.149 p.u. | X <sub>q''</sub> | 0.178       | 0.178 p.u. | T <sub>d''</sub> | 0.01307 s | T <sub>q0''</sub> | 0.16448 s |  |
| X <sub>2</sub>   | 0.179       | 0.163 p.u. | X <sub>0</sub>   | 0.070       | 0.064 p.u. | T <sub>a</sub>   | 0.02546 s | T <sub>q'</sub>   | 0.2614 s  |  |
| X <sub>1s</sub>  | n.a.        | 0.089 p.u. |                  |             |            |                  |           | T <sub>q''</sub>  | 0.02614 s |  |

|                                |      |                |           |
|--------------------------------|------|----------------|-----------|
| Short circuit ratio saturated: | 0.46 | Z <sub>n</sub> | 0.529 Ohm |
|--------------------------------|------|----------------|-----------|

**Short circuit data:**

|  |                  |           |  |
|--|------------------|-----------|--|
| Initial short circuit current (3-phase): | I <sub>k''</sub> | 5054 A    |  |
| Max. peak current (3-phase):             | I <sub>s</sub>   | 12865 A   |  |
| Sustained short circuit current:         | I <sub>k</sub>   | 2259 A    | Minimum 3 x rated current for max.10 s |
| Initial short circuit torque:            | M <sub>k2</sub>  | 62.5 kNm  |  |
|  | M <sub>k3</sub>  | 37.5 kNm  |  |
| Max. faulty synchron moment:             | M <sub>f</sub>   | 134.4 kNm |  |
| Rated kVA torque:                        | M <sub>SN</sub>  | 7.16 kNm  |  |
| Rated torque                             | M <sub>N</sub>   | 5.73 kNm  |  |
| Shaft torque                             | M <sub>Sh</sub>  | 6.04 kNm  |  |

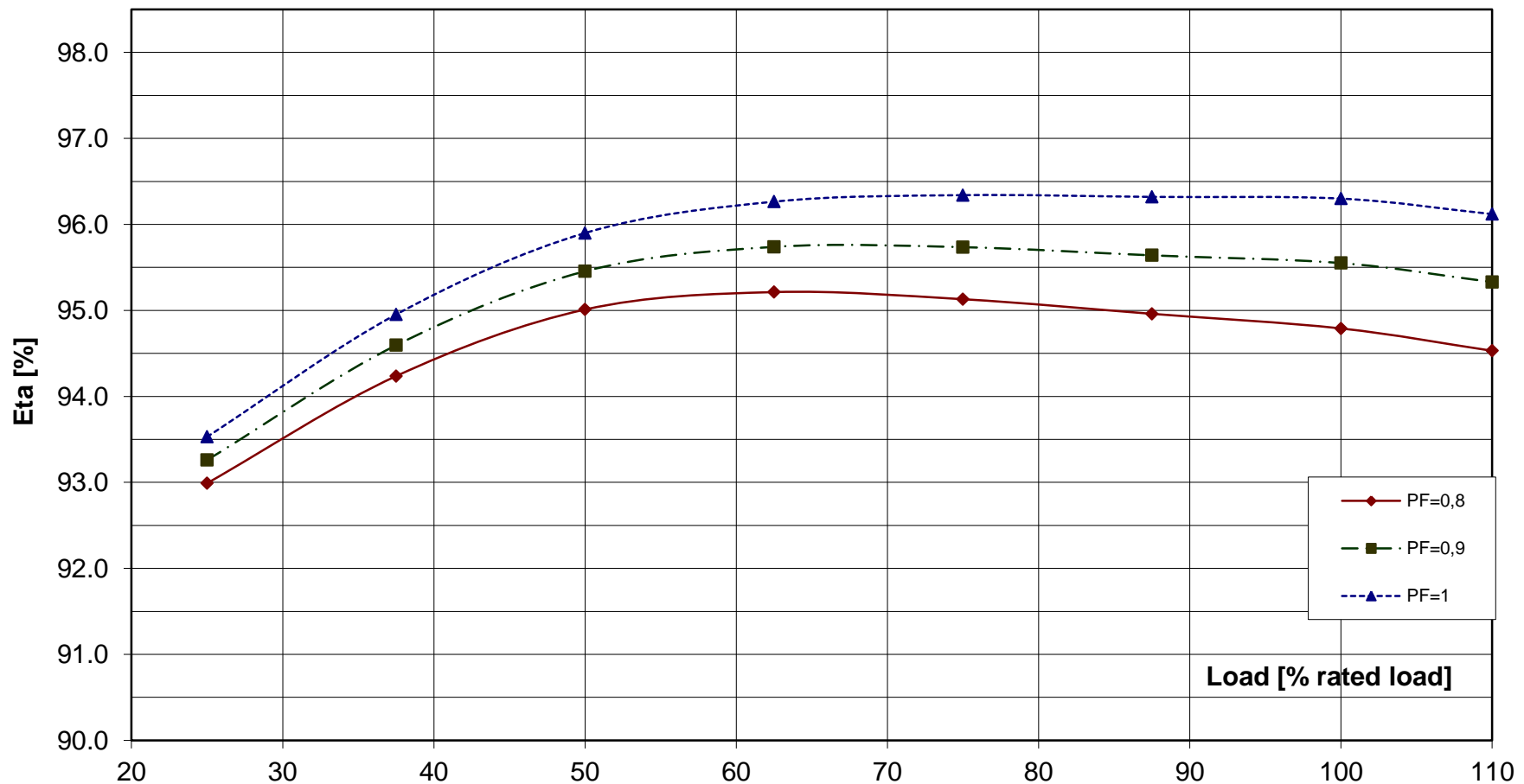
**Load application:**

|  |  |
|--|--|
| max. load application: 464 kVA (corresponds to 51,54 % from 900 kVA)<br>for Power factor 0.4<br>15% transient voltage drop | Power: 900 kVA<br>Power factor: 0.8<br>transient voltage drop: -22.5 % |
|--|--|

**Remarks:**

|                      |                    |                     |      |                          |
|----------------------|--------------------|---------------------|------|--------------------------|
| <b>Alternator :</b>  | <b>DSG 74 M1/6</b> |                     |      |                          |
| Rated output [kVA]   | 900                | Rated power factor: | 0.8  | Rated voltage [kV]: 0.69 |
| Rated frequency [Hz] | 60                 | Rated speed [rpm]   | 1200 |                          |

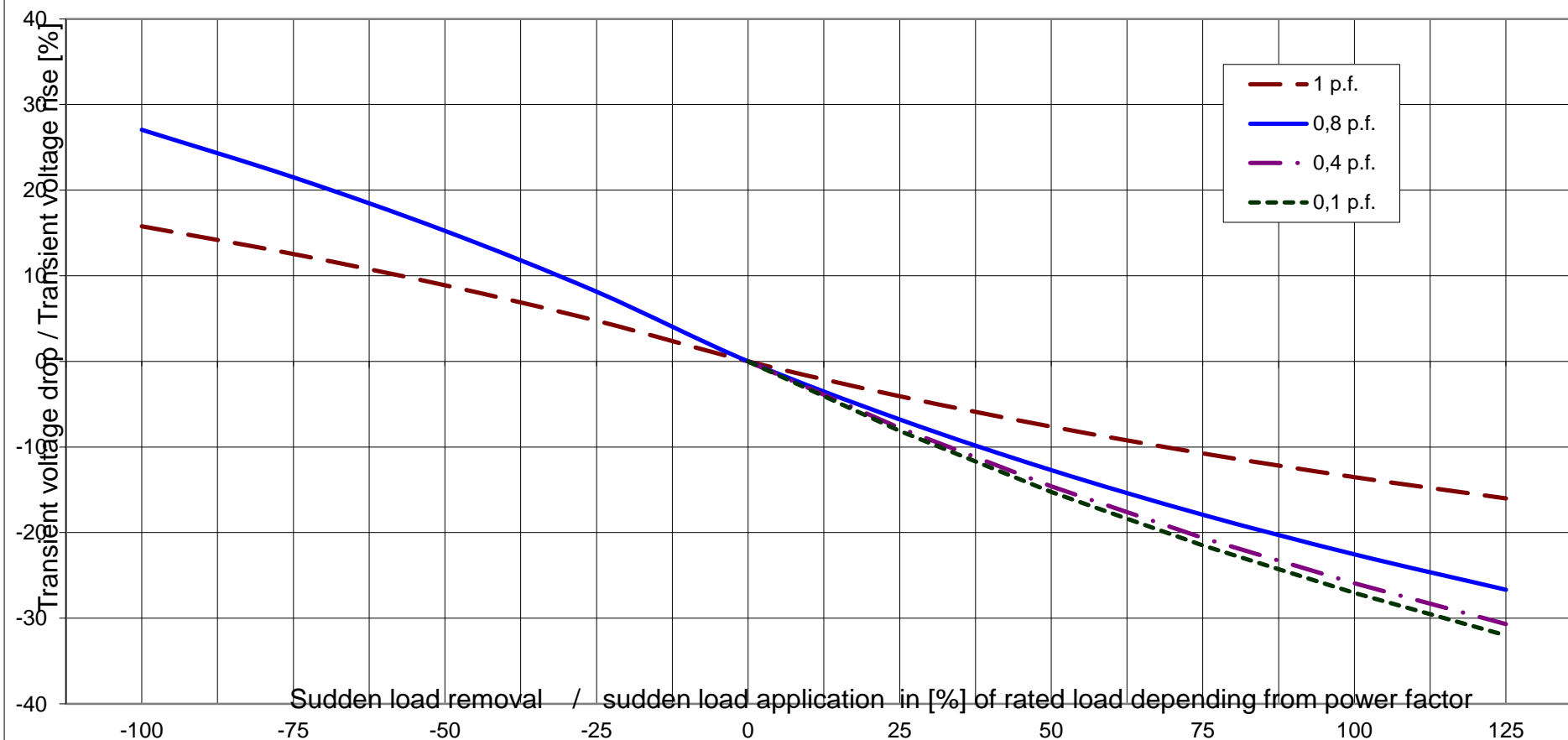
### Wirkungsgrad-Kennlinie - Efficiency Curve



**Alternator : DSG 74 M1/6**

|                      |     |                     |      |                     |      |
|----------------------|-----|---------------------|------|---------------------|------|
| Rated output [kVA]   | 900 | Rated power factor: | 0.8  | Rated voltage [kV]: | 0.69 |
| Rated frequency [Hz] | 60  | Rated speed [rpm]   | 1200 |                     |      |

**Transient Voltage rise or drop for sudden load removal or application**

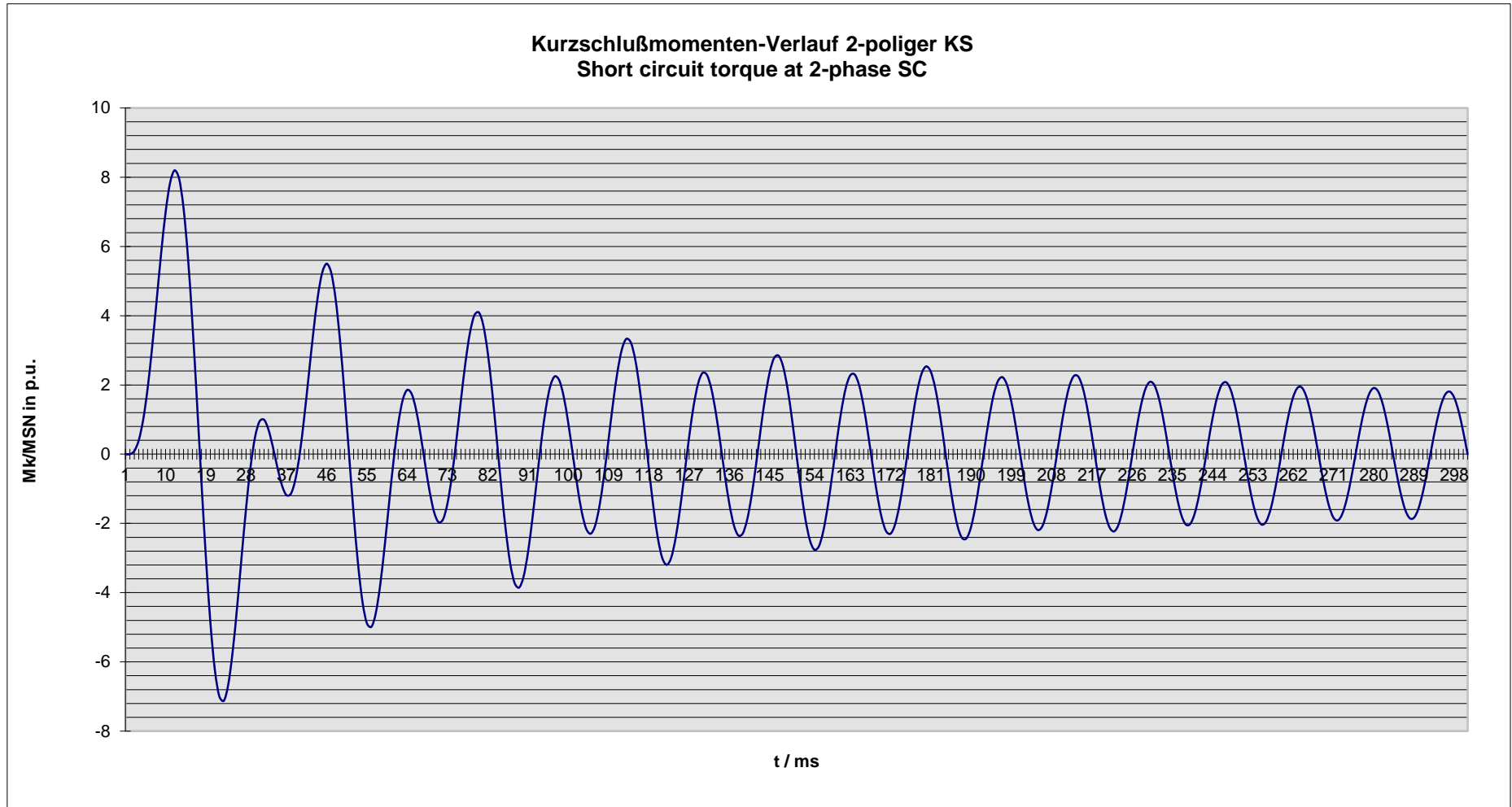




Technisches Datenblatt - Diagramme  
Technical data sheet - Diagrams

ING-FCD-0112

|                      |                    |                     |      |                              |
|----------------------|--------------------|---------------------|------|------------------------------|
| <b>Alternator :</b>  | <b>DSG 74 M1/6</b> |                     |      |                              |
| Rated output [kVA]   | 900                | Rated power factor: | 0.8  | Rated voltage [kV]: 0.69     |
| Rated frequency [Hz] | 60                 | Rated speed [rpm]   | 1200 | MSN related to kVA: 7.16 KNm |



#### Nenn Daten / nominal data

DSG 74 M1/6

Leistung  $S_N$ : **900 kVA**

$\cos \varphi$ : **0.80**

Rating

p.f.

Spannung  $U_N$ : **0.69 kV**

Strom  $I_N$ : **753 A**

Voltage

Current

Frequenz  $f$ : **60 Hz**

Drehzahl  $n$ : **1,200 min<sup>-1</sup>**

Frequency

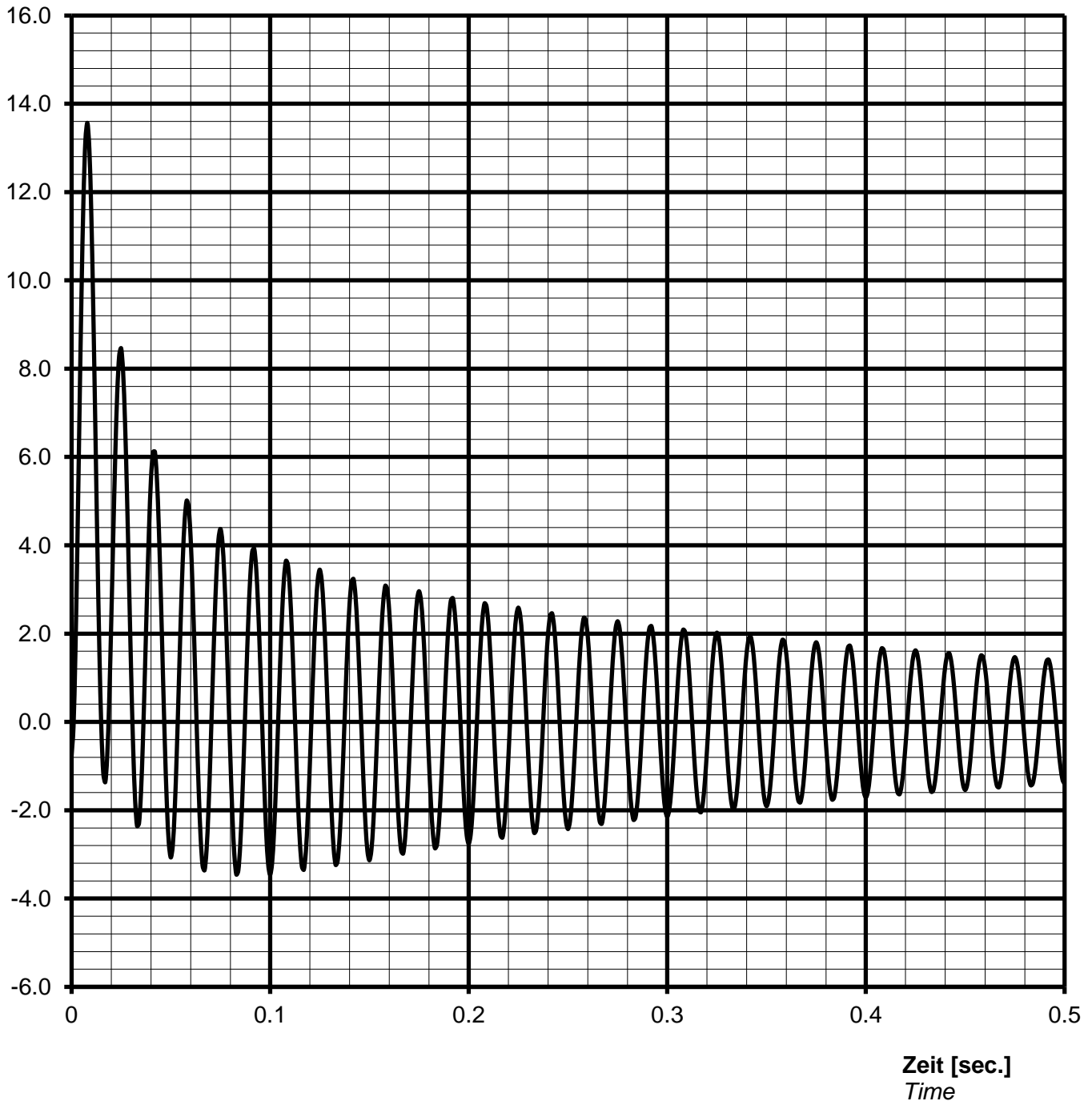
Speed

Schutzart **IP23**

Protection

Kurzschlussstrom  $I_{k3\text{phasig}} / I_N$  [p.u.]  
Short-circuit current  $I_{k3\text{phase}} / I_N$  [p.u.]

#### Stosskurzschluss-Strom, 3-phasig, asymmetrisch / Sudden short circuit current, 3-phase, asymmetrical



#### Notizen / remarks:

Maximum asymmetric peak value

$I_{\text{peak}} =$  **10217 A** or **13.57 p.u.**

**Nenn Daten / nominal data**

**DSG 74 M1/6**

Leistung  $S_N$ : **900 kVA**

$\cos \varphi$ : **0.80**

Rating

p.f.

Spannung  $U_N$ : **0.69 kV**

Strom  $I_N$ : **753 A**

Voltage

Current

Frequenz f: **60 Hz**

Drehzahl n: **1200 min<sup>-1</sup>**

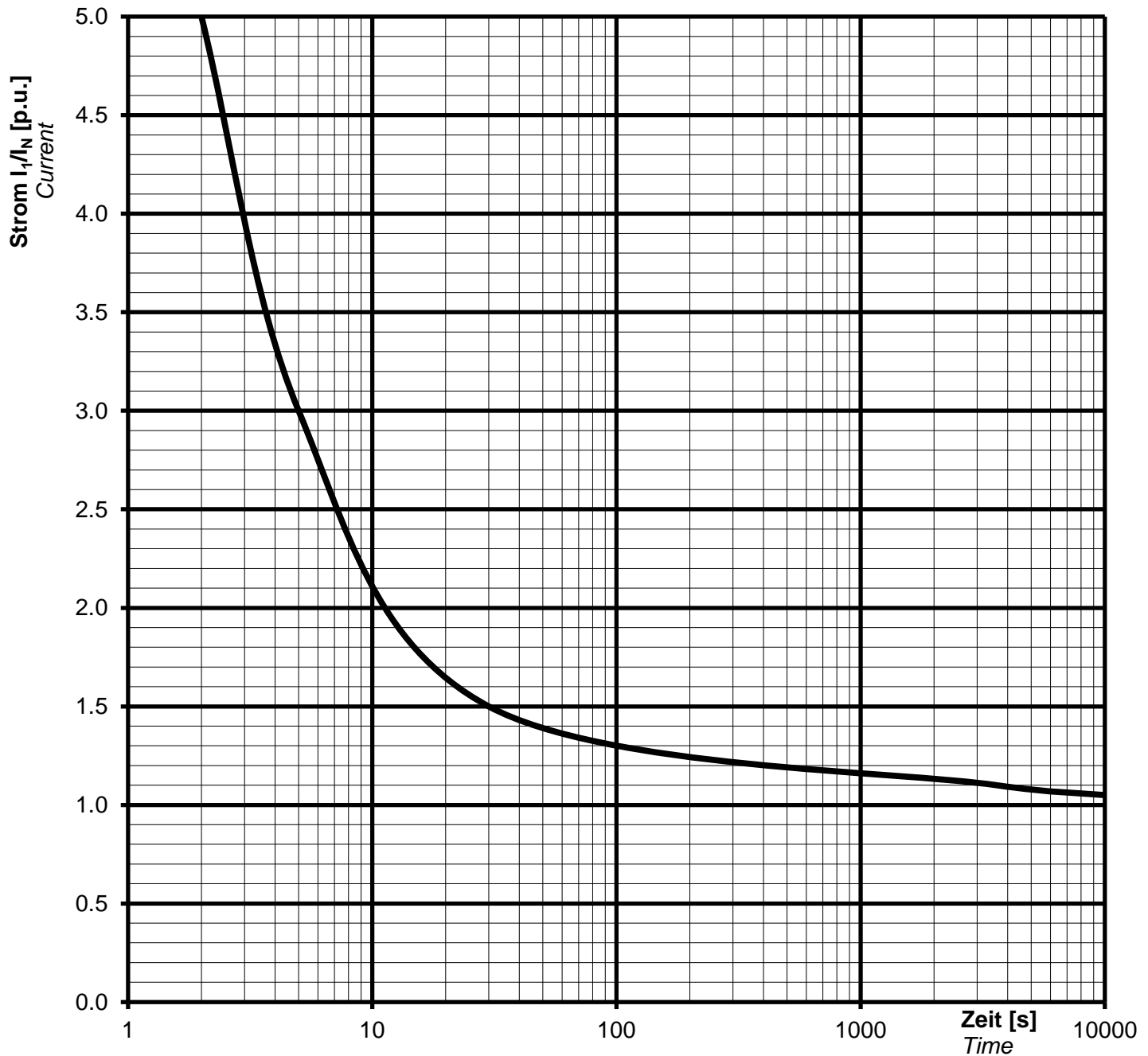
Frequency

Speed

Schutzart **IP23**

Protection

**Überlast Kennlinie**  
 Overload capability



**Notizen / remarks:**

Strom / Zeit Kriterien:

$(I/I_N)^2 \cdot t = 45s$

Current/time characteristics:

1,5 \*  $I_N$  for 30 s

1,1 \*  $I_N$  for 1 h in 6h

#### Nenndaten / nominal data

**DSG 74 M1/6**

Rating  $S_N$ : **900 kVA**

*p.f.* **0.80**

*Bemessungsleistung*

Leistungsfaktor  $\cos \varphi$ :

Nominal voltage  $U_N$ : **0.69 kV**

Nominal current  $I_N$ : **753 A**

*Bemessungsspannung*

*Bemessungsstrom*

Frequency  $f_N$ : **60 Hz**

Speed  $n$ : **1200 min<sup>-1</sup>**

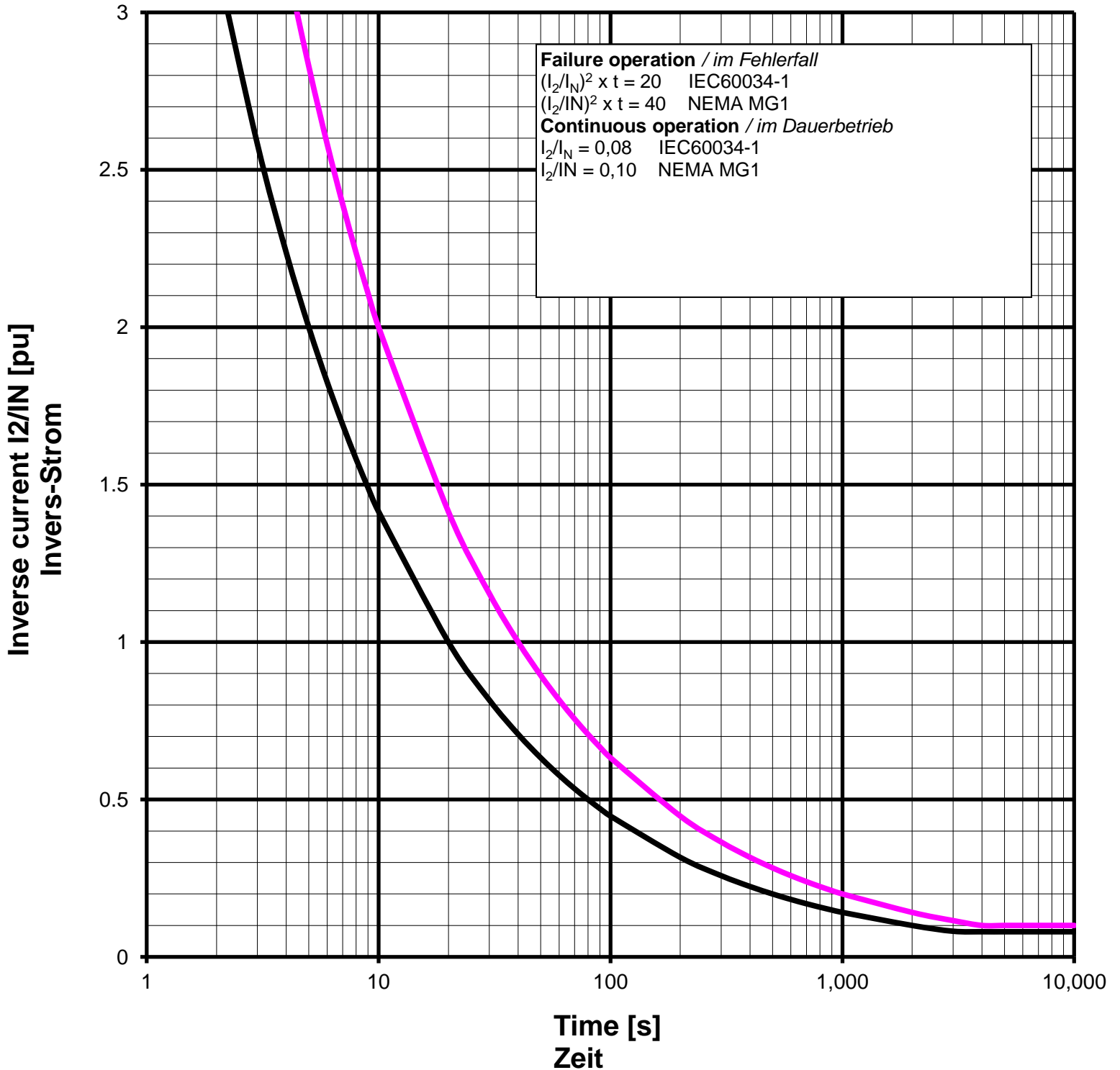
*Frequenz*

*Drehzahl*

Protection: **IP23**

*Schutzart*

#### Inverse current or unbalanced negative sequence current



Remarks / Notizen:



Technische Daten selbstregelnden Drehstrom-Synchrongenerator  
technical data for self regulating three phase alternator

ING-FCD-0112

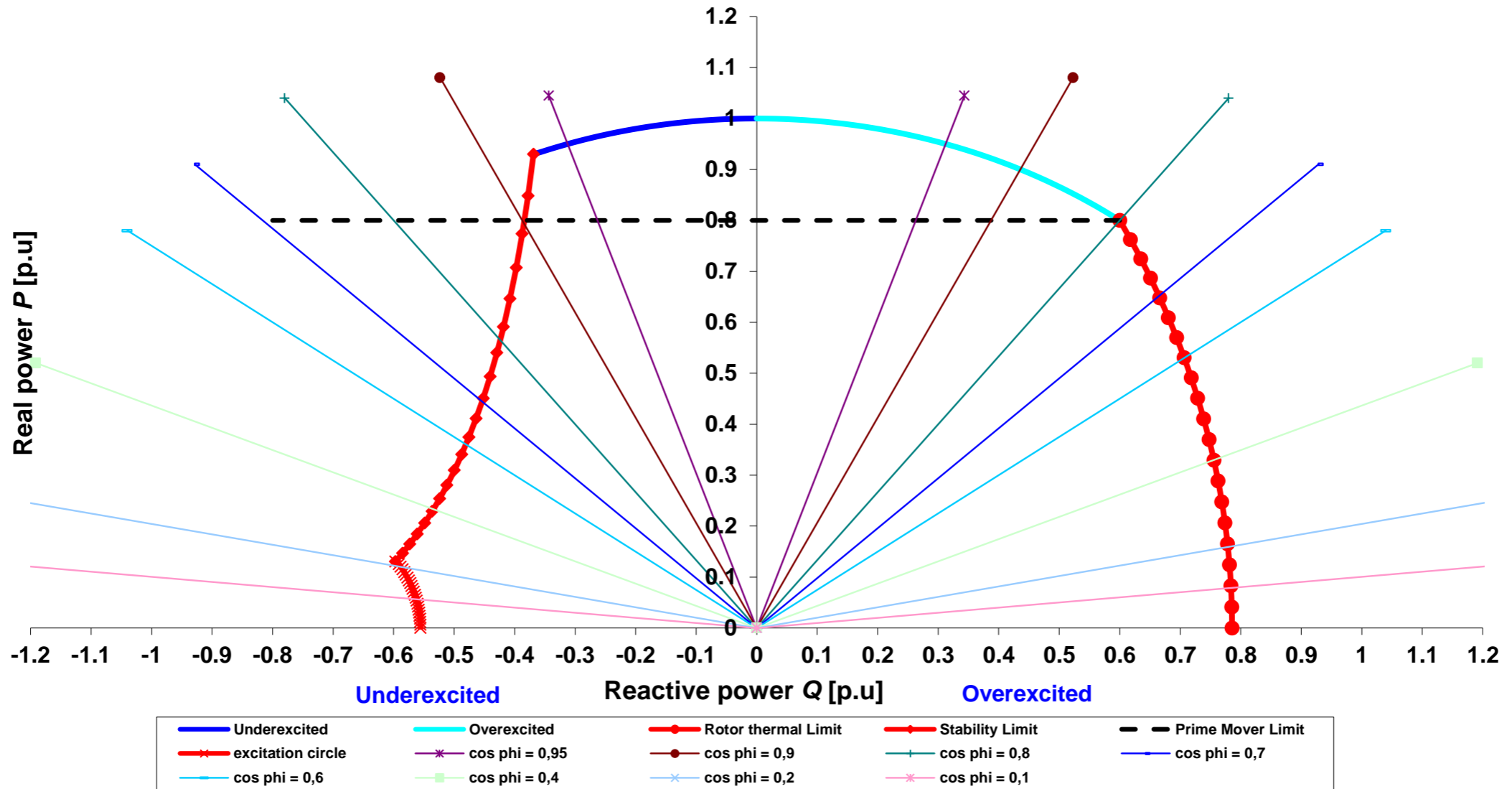
TYPE

DSG 74 M1/6

Projekt:

Order Nr.:

### Capability (P-Q) Diagram



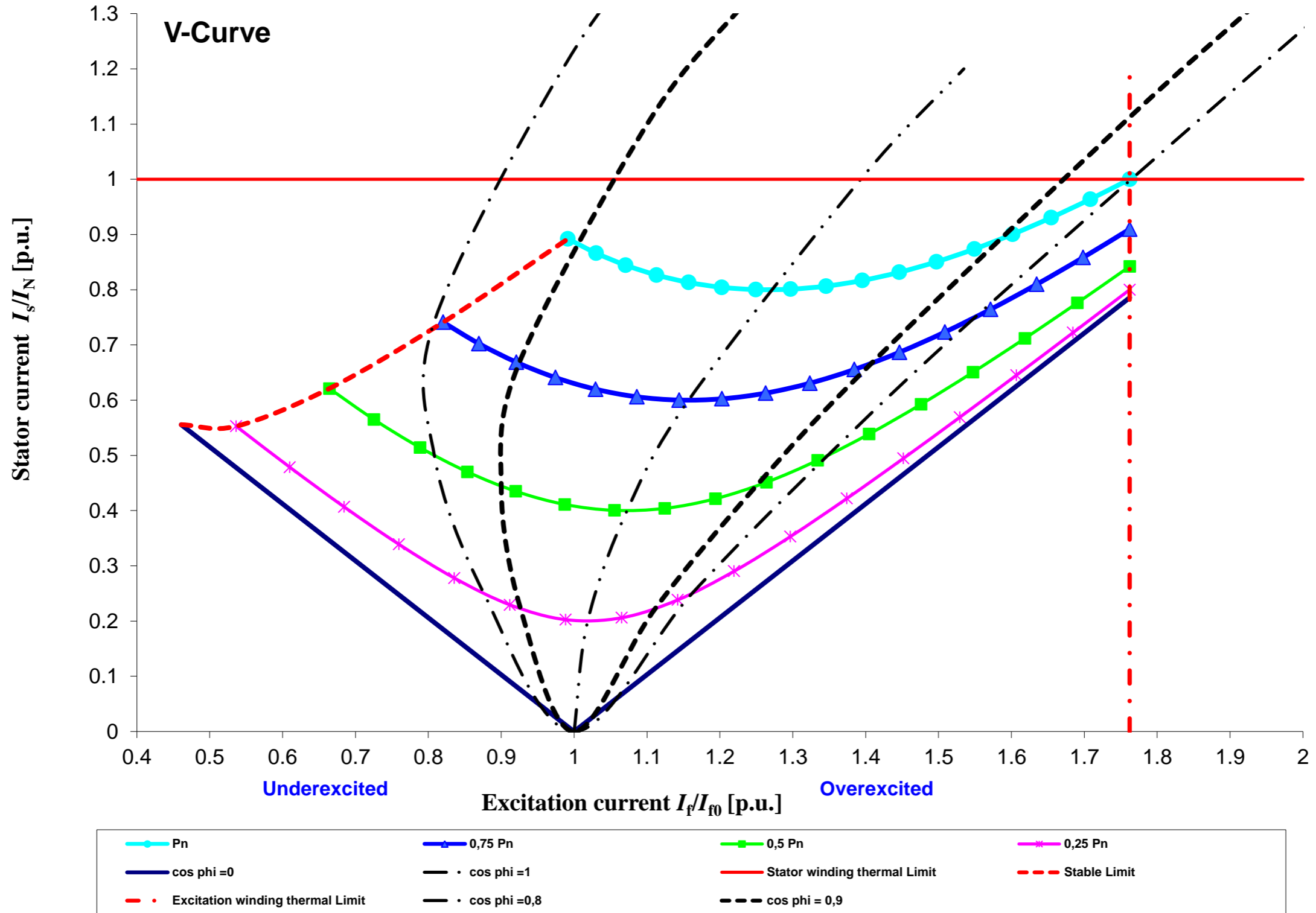
Cummins Generator Technologies

Datum / date:

03/01/2014



|      |             |          |  |            |  |
|------|-------------|----------|--|------------|--|
| TYPE | DSG 74 M1/6 | Projekt: |  | Order Nr.: |  |
|------|-------------|----------|--|------------|--|



|                                |               |  |
|--------------------------------|---------------|--|
| Cummins Generator Technologies | Datum / date: |  |
|                                | 03/01/2014    |  |