

**Technical Data Sheet for AvK-Alternators**

FM 7.3-5

Date:	09/10/13	Customer:	GENERIC DATASHEET only
Project No.:		AvK Reference:	dig142e_4_50_6600

**Object data:**

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

**Generator data:**

Generator:	DIG 142 e/4	Poles:	4	Standards:	IEC 60034
Rated power:	4450 kVA	3560 kWe	3662 kWm		
Power factor:	0.80				
Power at pf 1,0	3581 kVA	3581 kWe	3662 kWm		
Rated voltage:	6.6 kV				
Speed:	1500 1/min				
Frequency:	50 Hz			Voltage range / frequency range:	
Rated current:	389.3 A			Zone A according IEC 60034-1 (dU = +/-5%, df = +/-2%)	

Winding pitch:	ca. 5/6
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Insulation class:	Stator: Class F	Rotor: Class F	Temperature rise:	F
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Ambient temperature:	40 ° C	Environment:	Standard environment
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Site altitude:	1000 m		
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Enclosure:	IP23	Filter:	
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Cooling:	IC 01 - Open-circuit ventilation
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Coolant:	Ambient Air	Temperature	40 ° C	Temperature Air inlet	40 ° C
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		Coolant:		generator:	
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		Cooling air vol.:	4.2 m³/s	Cooling water quantity:	n/a
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Moment of inertia (I):	177 kgm²	Weight:	10250 Kg	Losses (environment):	102 KW
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		Losses (cooling):	n/a		
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Wires:	4 terminals, starpoint connected in terminal box
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Operation mode:	Single mode
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Regulators:	
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Voltage regulator:	DECS 100
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**Electrical data: (acc. IEC)**

Efficiencies:	110%	100%	75%	50%	25%
Power factor 0.8	97,07	97,21	97,26	96,84	95,2
Power factor 0.9	97,38	97,51	97,47	97,01	95,34
Power factor 1.0	97,69	97,8	97,67	97,18	95,47

**Reactances and time constants**

	unsaturated	saturated		unsaturated	saturated				
$X_d$	2.93	2.64 p.u.	$X_q$	1.47	1.44 p.u.	$T_{d0'}$	3.7 s	$T_{d0''}$	0.02825 s
$X_d'$	0.250	0.250 p.u.	$X_q'$	1.47	1.44 p.u.	$T_{d'}$	0.32 s	$T_{q0'}$	0.4 s
$X_d''$	0.195	0.177 p.u.	$X_q''$	0.195	0.195 p.u.	$T_{d''}$	0.02 s	$T_{q0''}$	0.30154 s
$X_2$	0.205	0.186 p.u.	$X_0$	0.058	0.053 p.u.	$T_a$	0.12 s	$T_{q'}$	0.4 s
$X_{1s}$	n.a.	0.106 p.u.						$T_{q''}$	0.04 s

Short circuit ratio saturated: 0.38	$Z_n$ 9.789 Ohm
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**Short circuit data:**

Initial short circuit current (3-phase):	$I_k''$	2199 A	
Max. peak current (3-phase):	$I_s$	5598 A	
Sustained short circuit current:	$I_k$	1168 A	Minimum 3 x rated current for max.10 s

Initial short circuit torque:	$M_{k2}$	208.1 kNm
	$M_{k3}$	124.9 kNm

Max. faulty synchron moment:	$M_f$	447.4 kNm
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Rated kVA torque:	$M_{SN}$	28.33 kNm
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Rated torque	$M_N$	22.66 kNm
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Shaft torque	$M_{Sh}$	23.31 kNm
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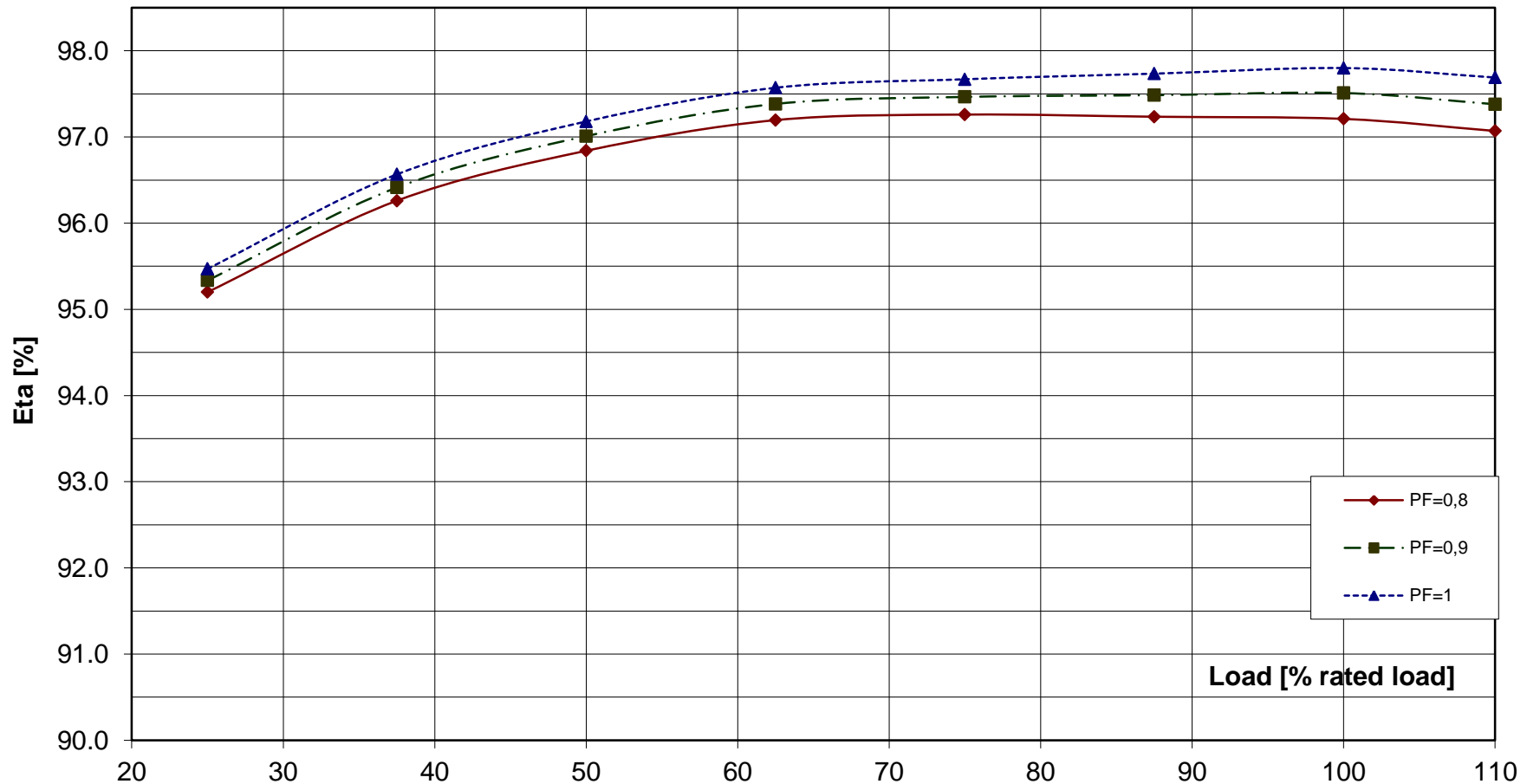
**Load application:**

max. load application: 2670 kVA (corresponds to 60 % from 4450 kVA) for Power factor 0.4 15% transient voltage drop	Power: 4450 kVA Power factor: 0.8 transient voltage drop: -20.0 %
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**Remarks:**

<b>Alternator :</b>	<b>DIG 142 e/4</b>			
Rated output [kVA]	4450	Rated power factor:	0.8	Rated voltage [kV]: 6.6
Rated frequency [Hz]	50	Rated speed [rpm]	1500	

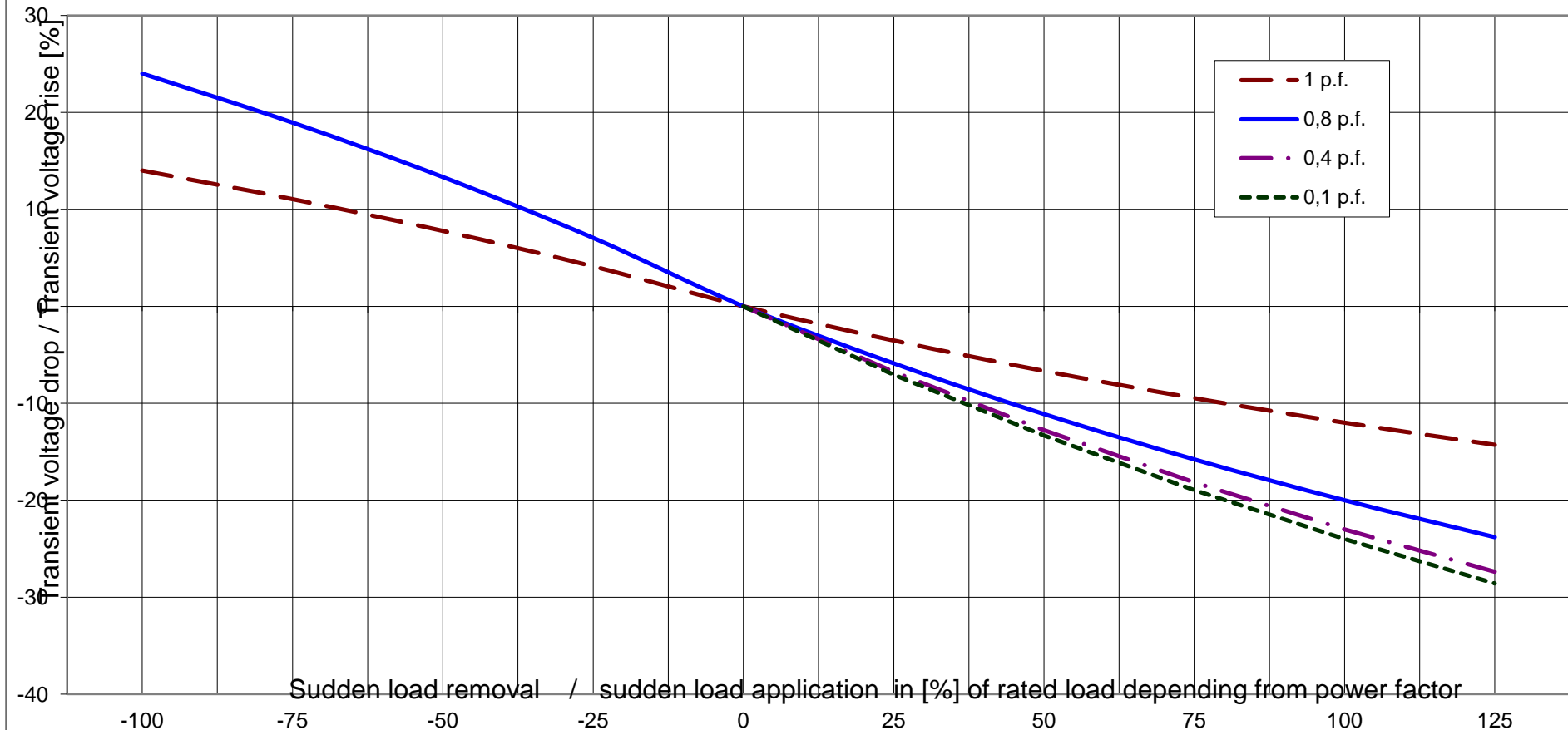
### Wirkungsgrad-Kennlinie - Efficiency Curve



**Alternator : DIG 142 e/4**

Rated output [kVA]	4450	Rated power factor:	0.8	Rated voltage [kV]:	6.6
Rated frequency [Hz]	50	Rated speed [rpm]	1500		

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



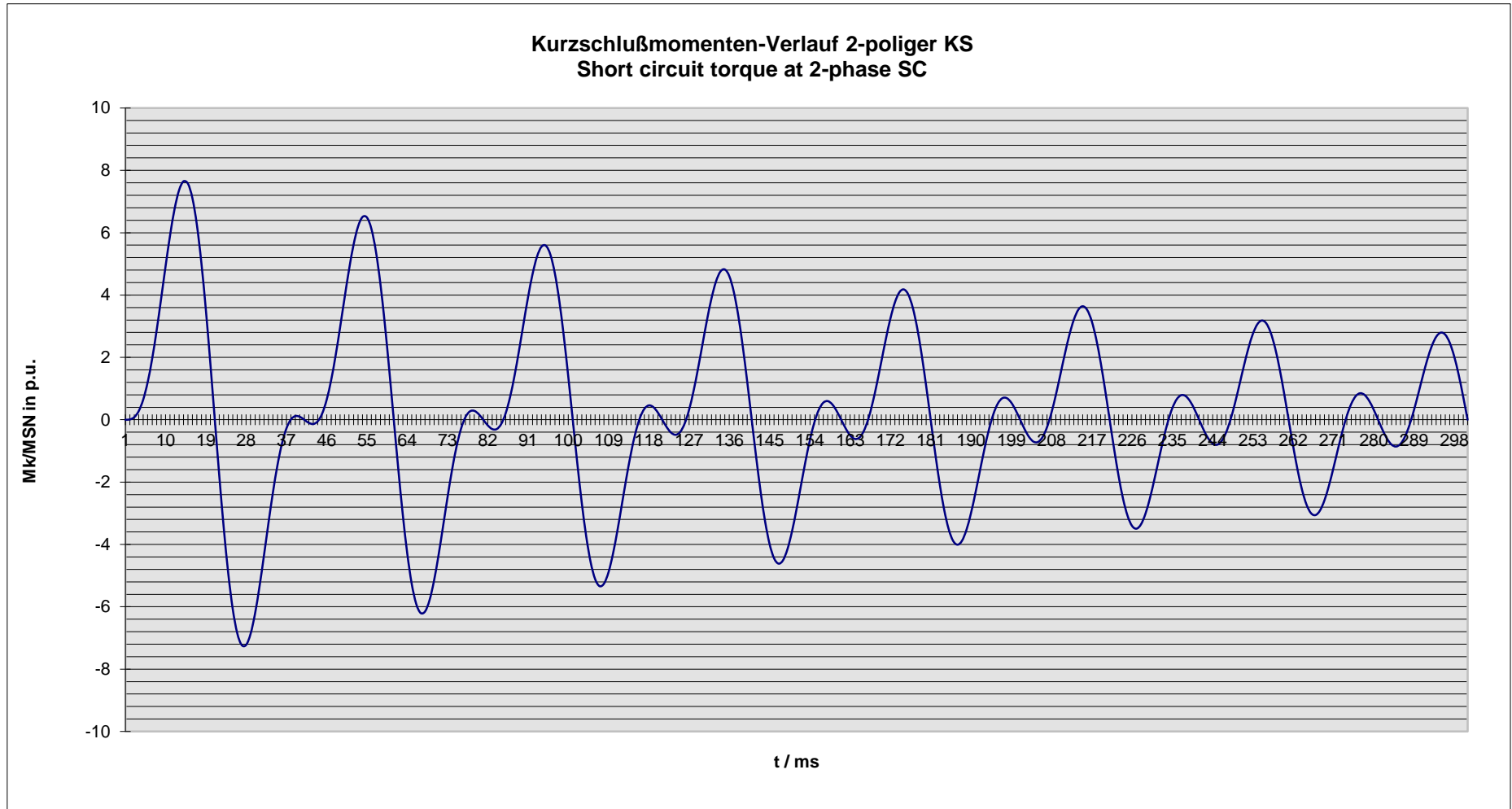


Technisches Datenblatt - Diagramme  
Technical data sheet - Diagrams

ING-FCD-0112

<b>Alternator :</b>	<b>DIG 142 e/4</b>			
Rated output [kVA]	4450	Rated power factor:	0.8	Rated voltage [kV]: 6.6
Rated frequency [Hz]	50	Rated speed [rpm]	1500	MSN related to kVA: 28.33 KNm

Kurzschlußmomenten-Verlauf 2-poliger KS  
Short circuit torque at 2-phase SC



**Nenndaten / nominal data**

DIG 142 e/4

Leistung  $S_N$ : **4450 kVA**

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

*Rating*

*p.f.*

Spannung  $U_N$ : **6.60 kV**

Strom  $I_N$ : **389 A**

*Voltage*

*Current*

Frequenz  $f$ : **50 Hz**

Drehzahl  $n$ : **1,500 min<sup>-1</sup>**

*Frequency*

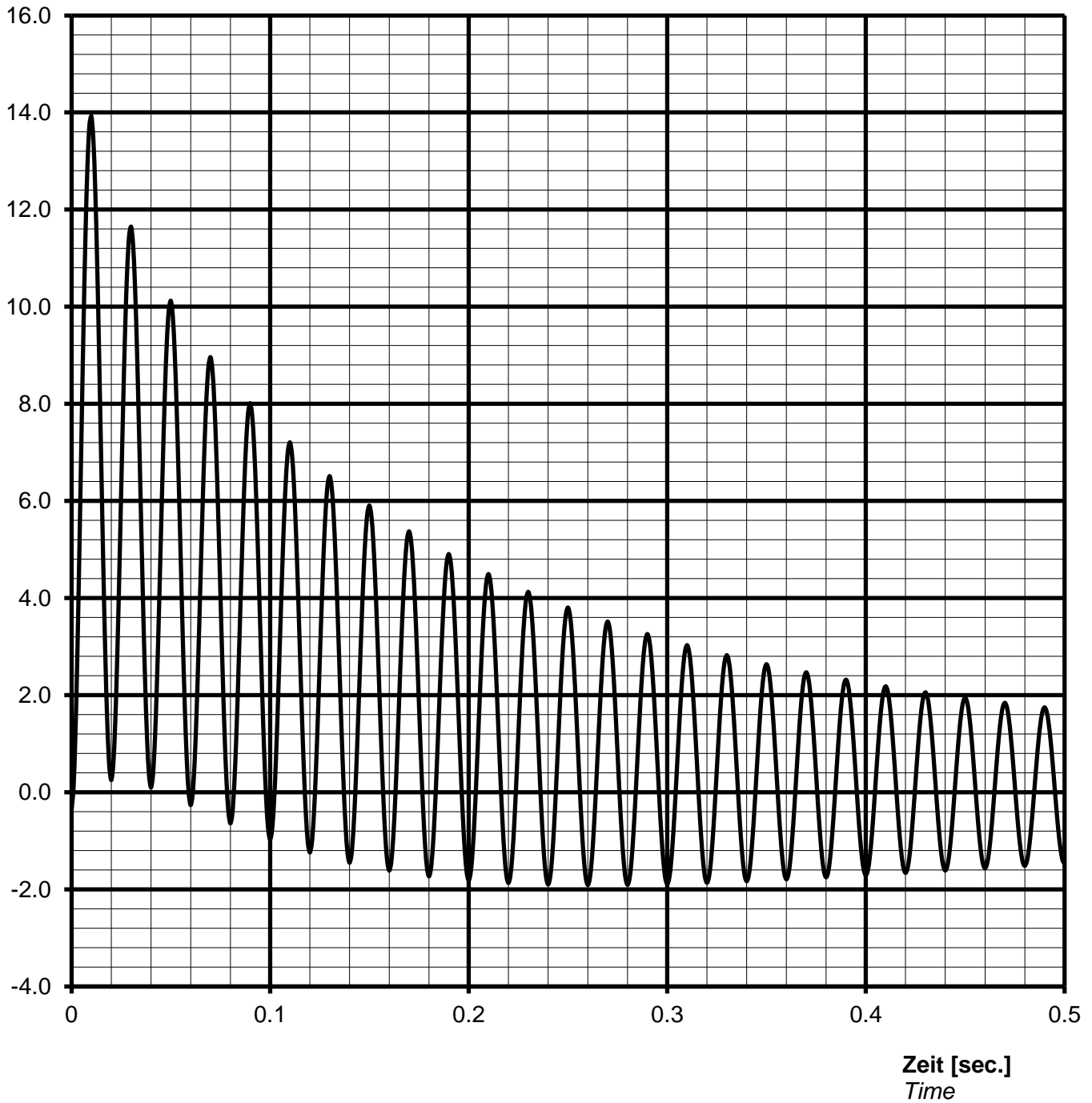
*Speed*

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  $I_{\text{peak}} = 5420 \text{ A}$  or  $13.92 \text{ p.u.}$**

**Nenn Daten / nominal data**

**DIG 142 e/4**

Leistung  $S_N$ : **4450 kVA**

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

Rating

p.f.

Spannung  $U_N$ : **6.60 kV**

Strom  $I_N$ : **389 A**

Voltage

Current

Frequenz f: **50 Hz**

Drehzahl n: **1500 min<sup>-1</sup>**

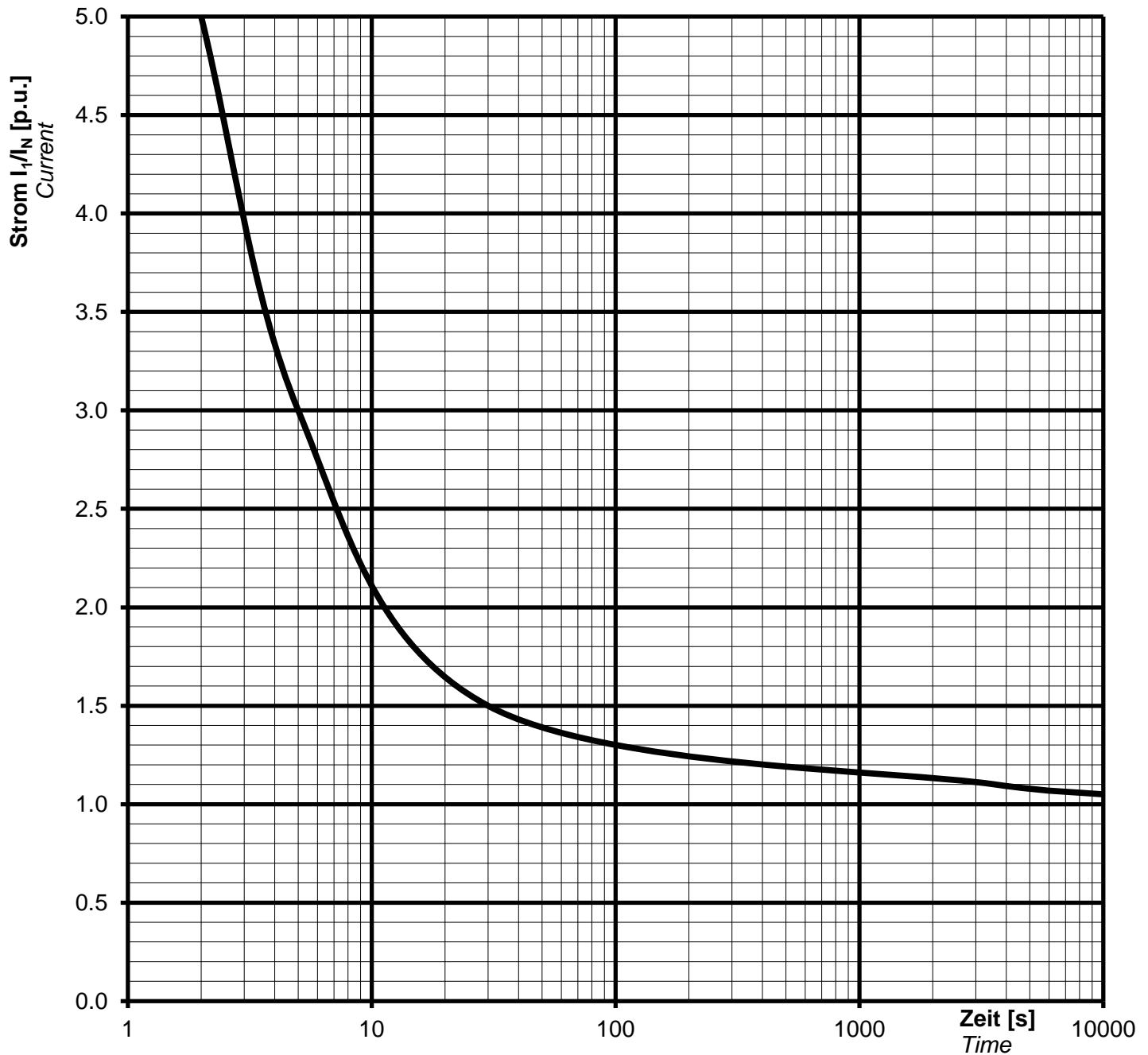
Frequency

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

DIG 142 e/4

Rating  $S_N$ : **4450 kVA**

*p.f.* **0.80**

*Bemessungsleistung*

Leistungsfaktor  $\cos \varphi$ :

Nominal voltage  $U_N$ : **6.60 kV**

Nominal current  $I_N$ : **389 A**

*Bemessungsspannung*

*Bemessungsstrom*

Frequency  $f_N$ : **50 Hz**

Speed  $n$ : **1500 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

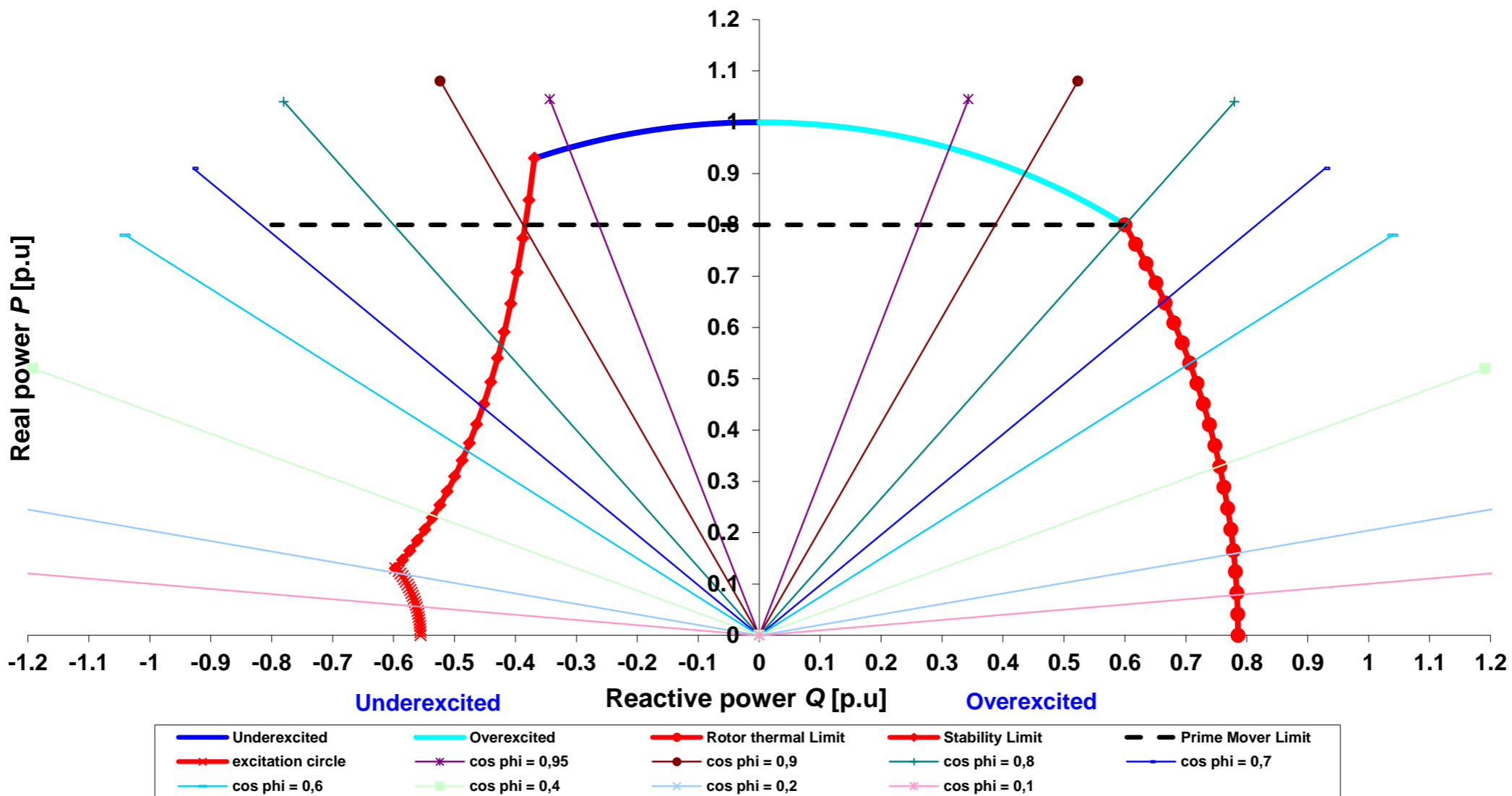
TYPE

DIG 142 e/4

Projekt:

Order Nr.:

### Capability (P-Q) Diagram



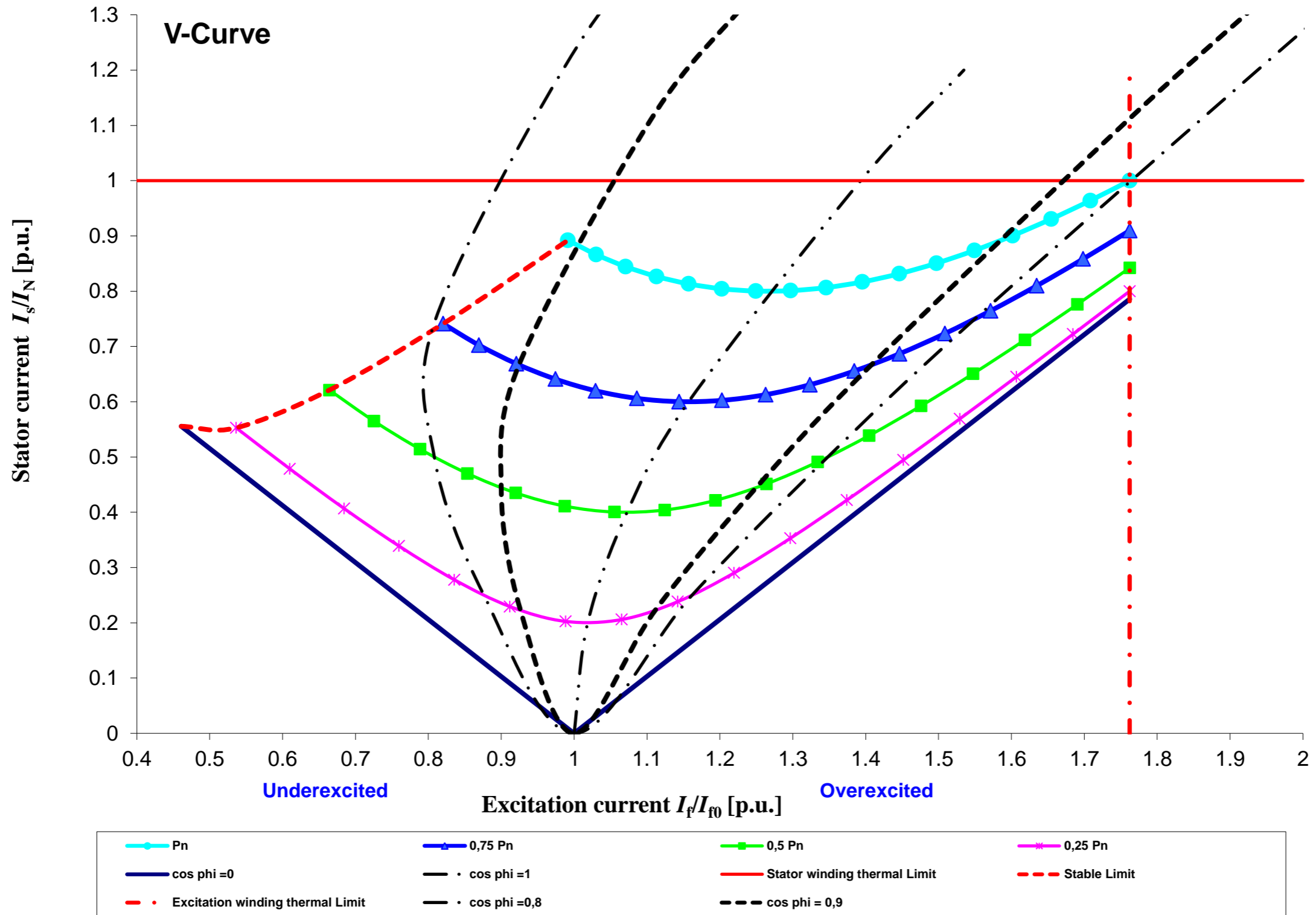
Cummins Generator Technologies

Datum / date:

17/10/2013



TYPE	DIG 142 e/4	Projekt:		Order Nr.:	
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Cummins Generator Technologies	Datum / date:	
	17/10/2013	