



## Technical Data Sheet for AvK-Alternators

FM 7.3-5

Date:	03/10/13	Customer:	GENERIC DATASHEET only
Project No.:		AvK Reference:	DIG110I_4_50_11000

<b>Object data:</b>	
Site:	Prime Mover:
Application: Stationary Power Plant	Manufacturer:

<b>Generator data:</b>					
Generator:	DIG 110 i/4	Poles:	4	Standards: IEC 60034	
Rated power:	1080 kVA	864 kWe	910 kWm		
Power factor:	0.80				
Power at pf 1,0	875 kVA	875 kWe	910 kWm		
Rated voltage:	11 kV				
Speed:	1500 1/min				
Frequency:	50 Hz	Voltage range / frequency range:			
Rated current:	56.7 A	Zone A according IEC 60034-1 (dU = +/-5%, df = +/-2%)			
Winding pitch:	ca. 5/6				
Insulation class:	Stator: Class F	Rotor: Class F	Temperature rise:	F	
Ambient temperature:	40 °C	Environment:	Standard environment		
Site altitude:	1000 m	Filter:			
Enclosure:	IP23				
Cooling:	IC 01 - Open-circuit ventilation				
Coolant:	Ambient Air	Temperature	40 °C	Temperature Air inlet	40 °C
		Coolant:		generator:	
		Cooling air vol.:	1.3 m³/s	Cooling water quantity:	n/a
Moment of inertia (I):	26 kgm²	Weight:	3600 Kg	Losses (environment):	46 KW
				Losses (cooling):	n/a

Wires:	4 terminals, starpoint connected in terminal box
Operation mode:	Single mode
Regulators:	
Voltage regulator:	DECS 100

<b>Electrical data: (acc. IEC)</b>					
Efficiencies:	110%	100%	75%	50%	25%
Power factor 0.8	94,65	94,9	94,8	94,2	91
Power factor 0.9	95,33	95,55	95,35	94,55	91,15
Power factor 1.0	96,01	96,2	95,9	94,9	91,3

<b>Reactances and time constants</b>										
	unsaturated		saturated			unsaturated		saturated		
X <sub>d</sub>	2.30	2.07	p.u.	X <sub>q</sub>	1.15	1.13	p.u.	T <sub>d0'</sub>	2.25	s
X <sub>d'</sub>	0.290	0.290	p.u.	X <sub>q'</sub>	1.15	1.13	p.u.	T <sub>d'</sub>	0.28	s
X <sub>d''</sub>	0.209	0.190	p.u.	X <sub>q''</sub>	0.209	0.209	p.u.	T <sub>d''</sub>	0.014	s
X <sub>2</sub>	0.220	0.200	p.u.	X <sub>0</sub>	0.063	0.057	p.u.	T <sub>a</sub>	0.036	s
X <sub>1s</sub>	n.a.	0.114	p.u.					T <sub>q'</sub>	0.28	s
								T <sub>q''</sub>	0.028	s
Short circuit ratio saturated: 0.48					Z <sub>n</sub> 112.037 Ohm					

<b>Short circuit data:</b>		
Initial short circuit current (3-phase):	I <sub>k'</sub>	298 A
Max. peak current (3-phase):	I <sub>s</sub>	759 A
Sustained short circuit current:	I <sub>k</sub>	170 A
Minimum 3 x rated current for max.10 s		
Initial short circuit torque:	M <sub>k2</sub>	47.0 kNm
	M <sub>k3</sub>	28.2 kNm
Max. faulty synchron moment:	M <sub>f</sub>	101.1 kNm
Rated kVA torque:	M <sub>SN</sub>	6.88 kNm
Rated torque	M <sub>N</sub>	5.50 kNm
Shaft torque	M <sub>Sh</sub>	5.80 kNm

<b>Load application:</b>	
max. load application: 559 kVA (corresponds to 51,72 % from 1080 kVA) for Power factor 0.4	Power: 1080 kVA
15% transient voltage drop	Power factor: 0.8
	transient voltage drop: -22.5 %

**Remarks:**

**Alternator :** DIG 110 i/4

Rated output [kVA]

1080

Rated power factor:

0.8

Rated voltage [kV]: 11

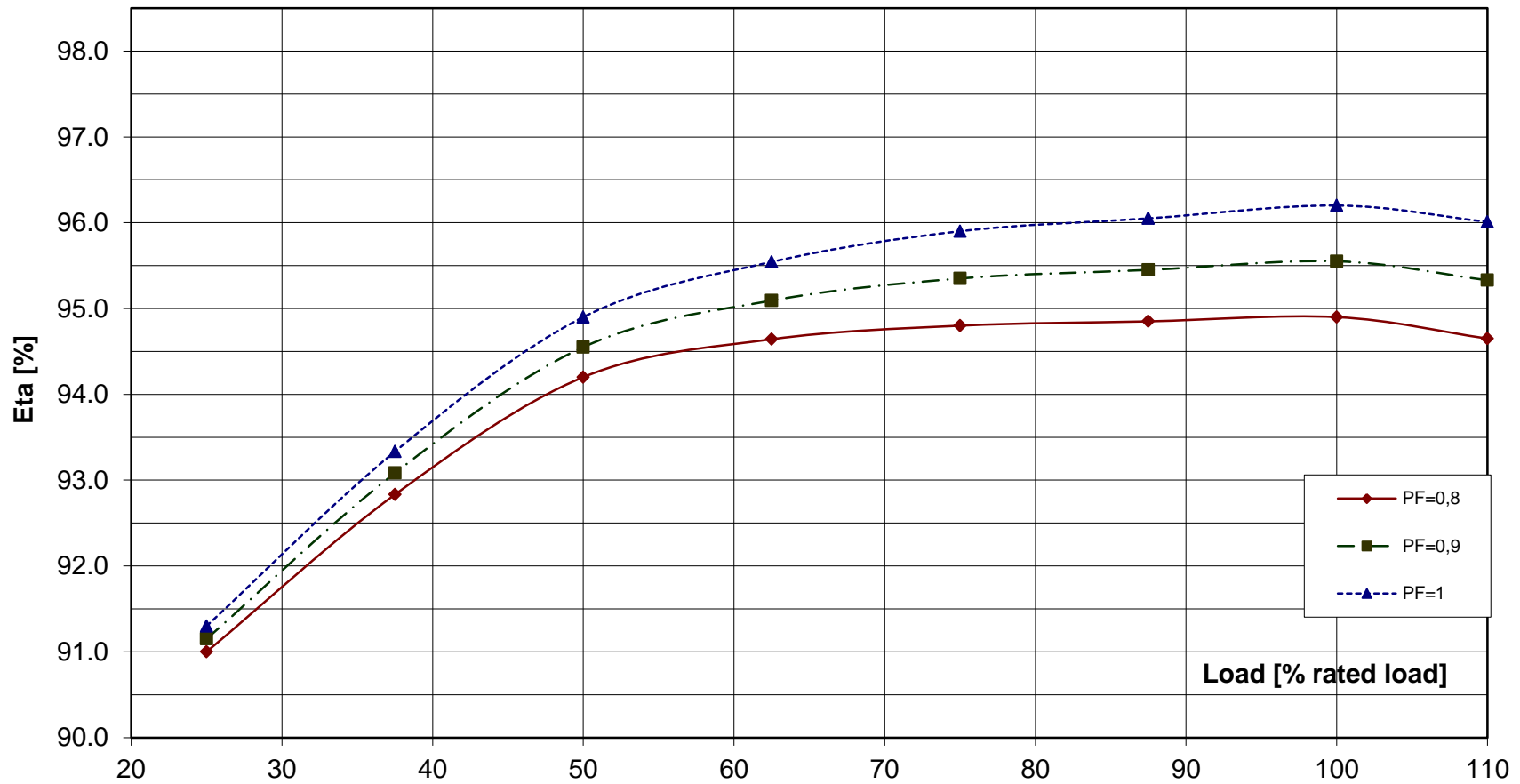
Rated frequency [Hz]

50

Rated speed [rpm]

1500

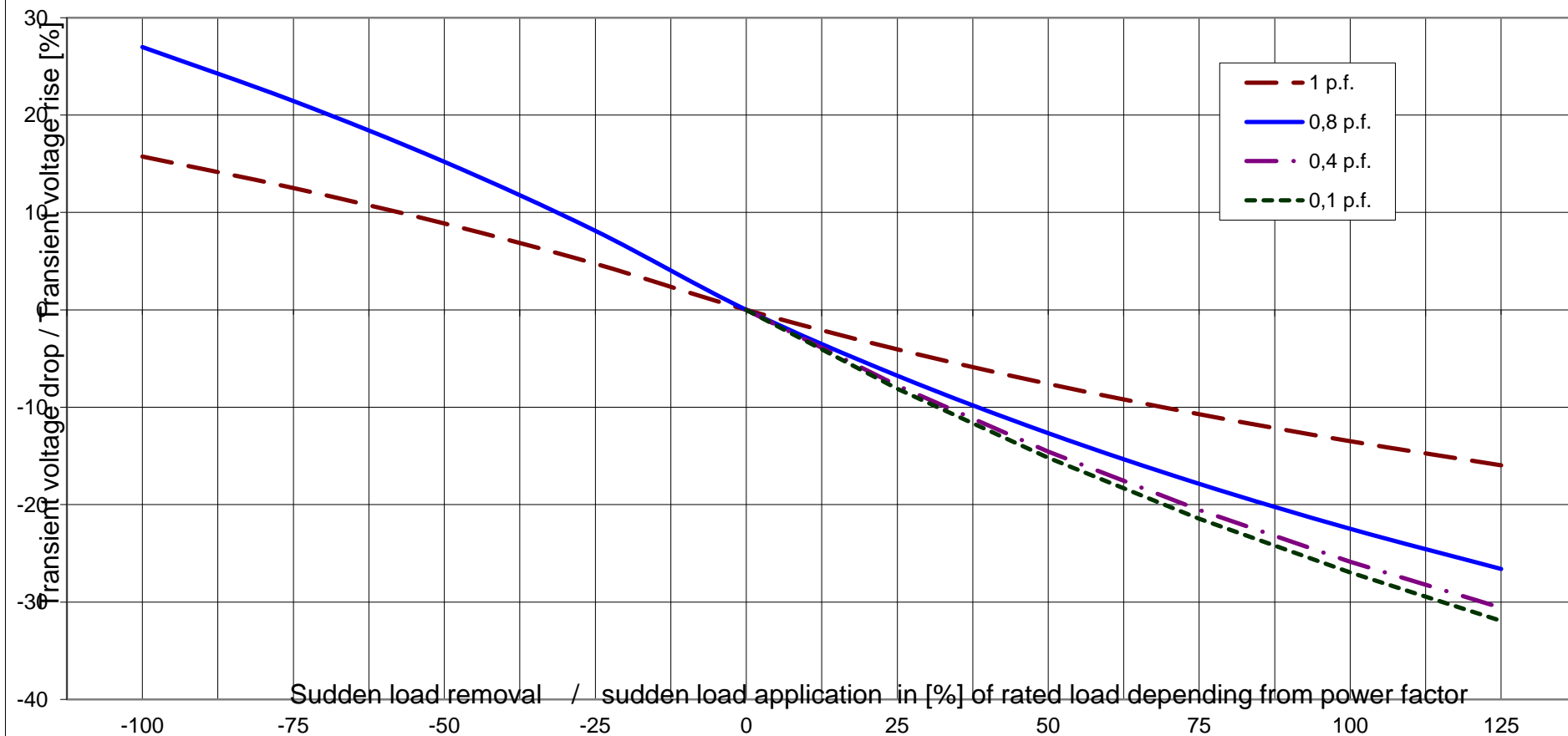
### Wirkungsgrad-Kennlinie - Efficiency Curve



**Alternator : DIG 110 i/4**

Rated output [kVA]	1080	Rated power factor:	0.8	Rated voltage [kV]:	11
Rated frequency [Hz]	50	Rated speed [rpm]	1500		

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





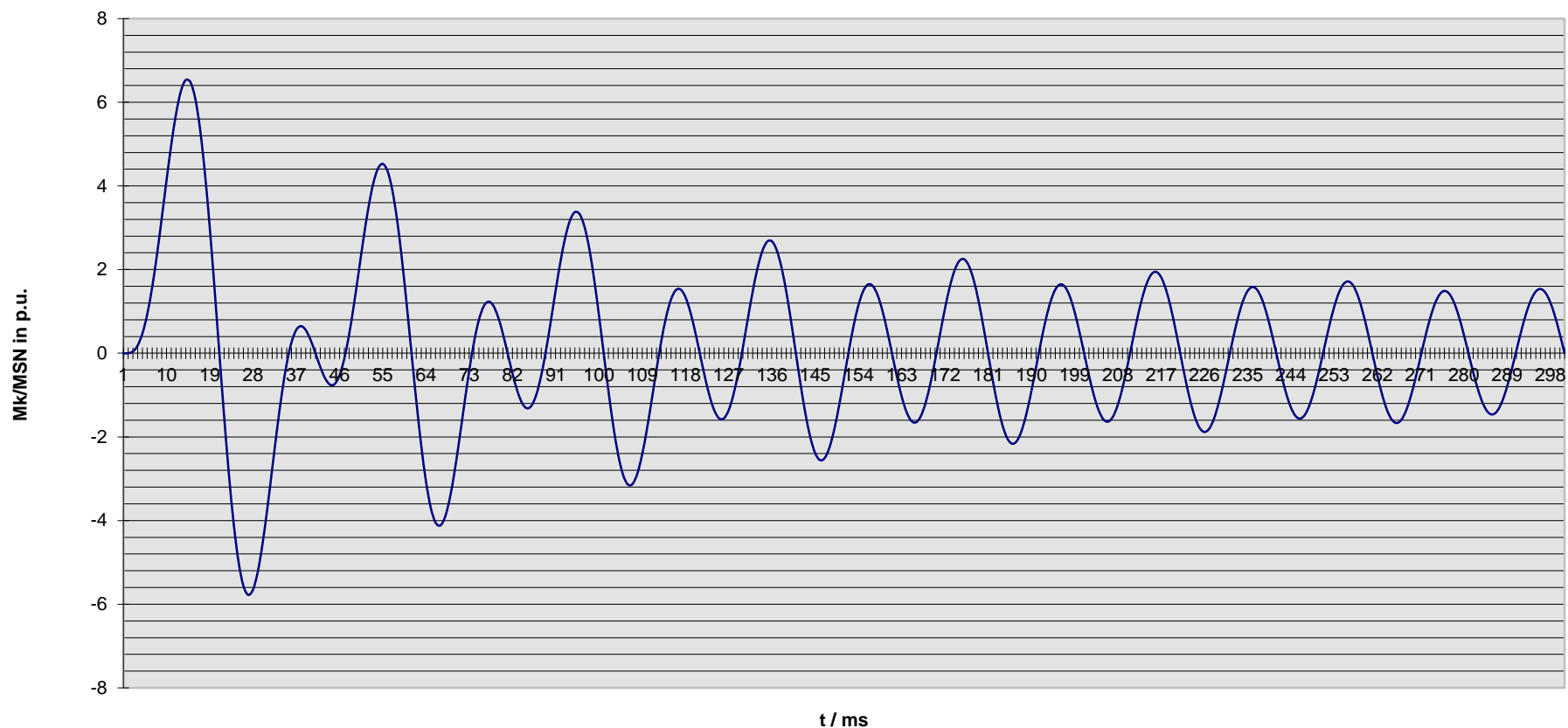
Technisches Datenblatt - Diagramme  
Technical data sheet - Diagrams

ING-FCD-0112

Alternator : DIG 110 i/4

Rated output [kVA]	1080	Rated power factor:	0.8	Rated voltage [kV]:	11
Rated frequency [Hz]	50	Rated speed [rpm]	1500	MSN related to kVA:	6.88 KNm

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



Nennenden / nominal data

DIG 110 i/4

Leistung  $S_N$ : **1080** kVA

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

Rating

p.f.

Spannung  $U_N$ : **11.00** kV

Strom  $I_N$ : **57** A

Voltage

Current

Frequenz  $f$ : **50** Hz

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

Frequency

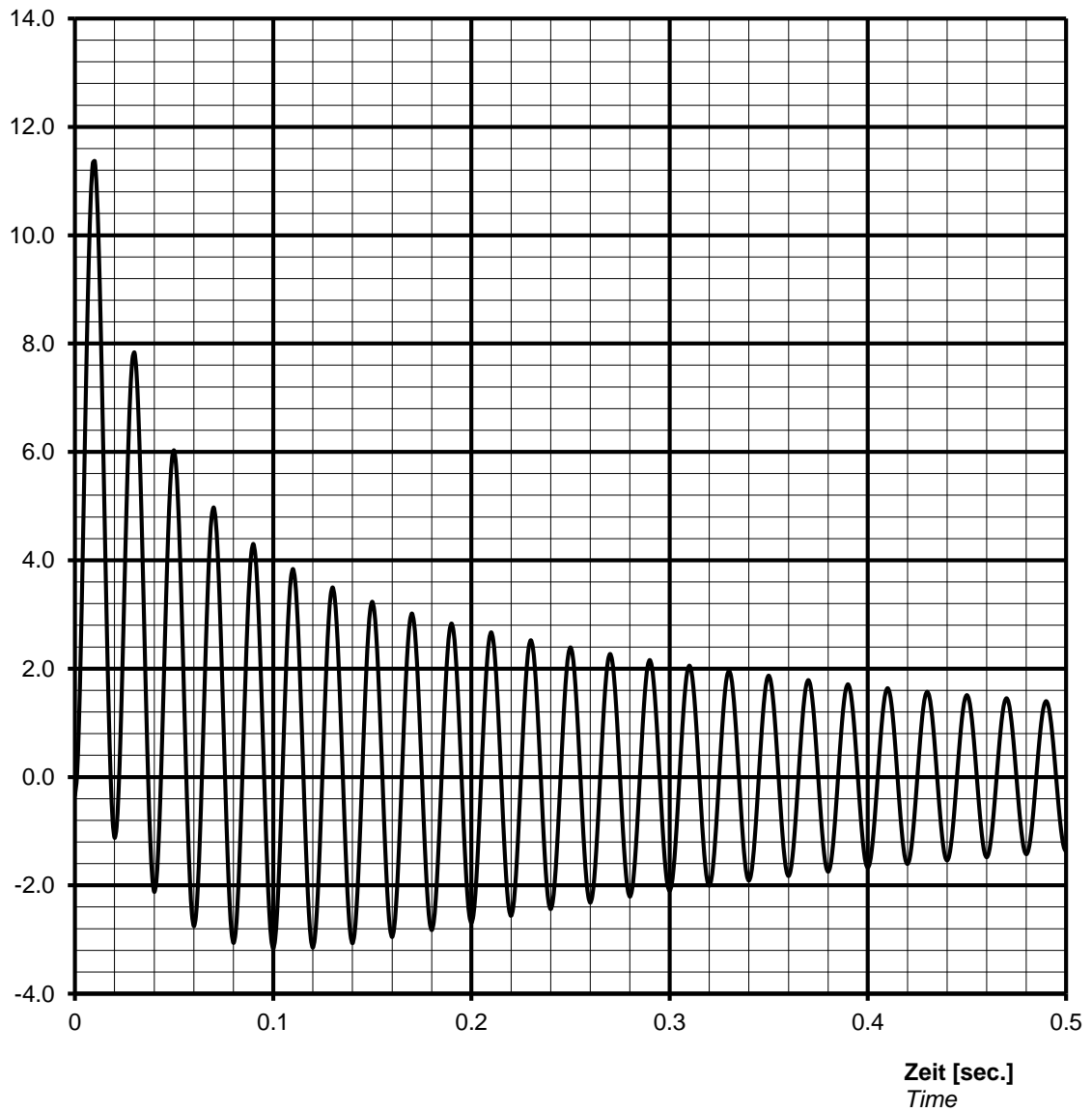
Speed

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  $I_{\text{speak}} =$  **644 A** or **11.37 p.u.**

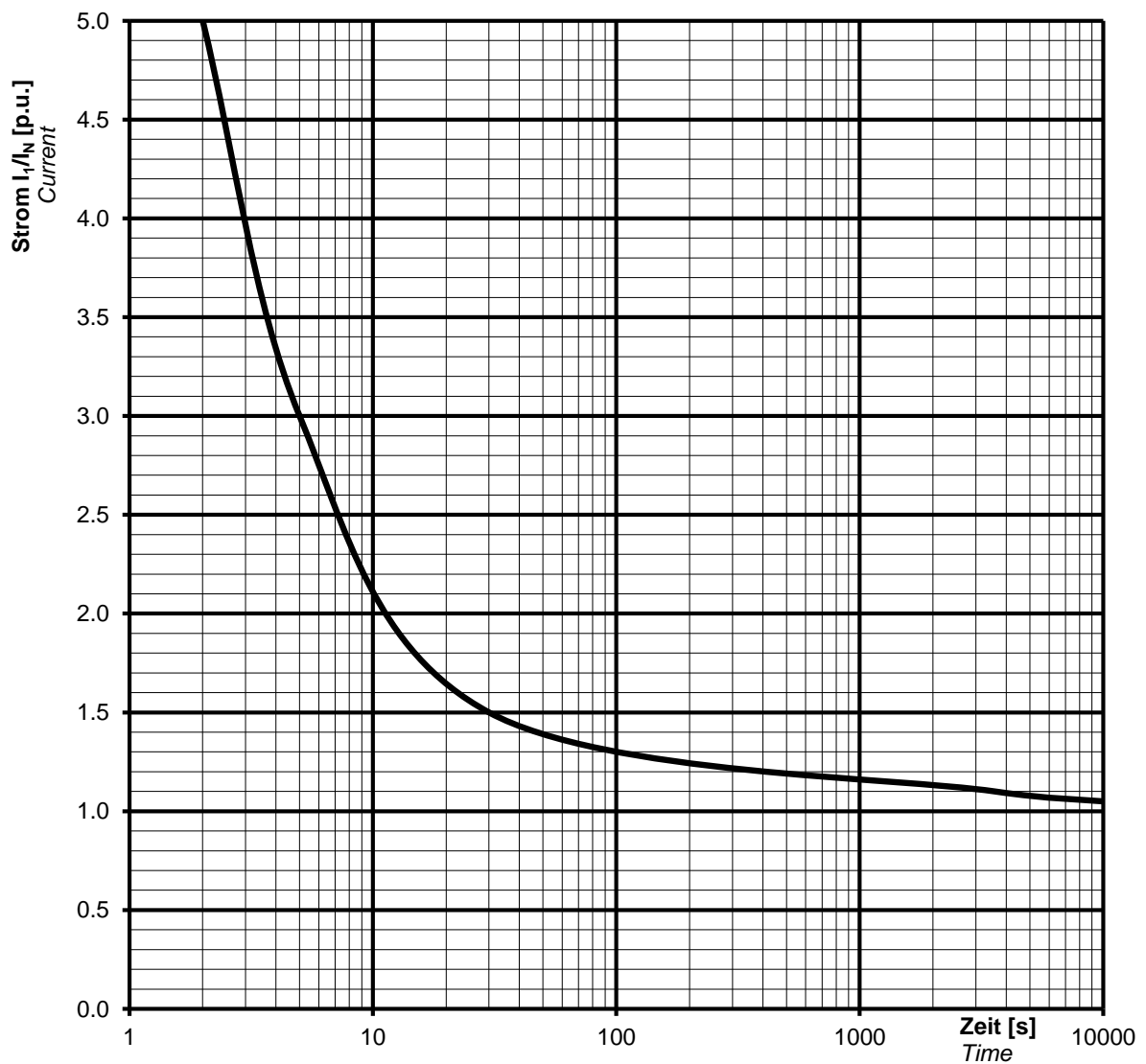
**Nenndaten / nominal data**

**DIG 110 i/4**

Leistung  $S_N$ : **1080** kVA  
*Rating*  
 Spannung  $U_N$ : **11.00** kV  
*Voltage*  
 Frequenz  $f$ : **50** Hz  
*Frequency*  
 Schutzart **IP23**  
*Protection*

$\cos \varphi$ : **0.80**  
*p.f.*  
 Strom  $I_N$ : **57** A  
*Current*  
 Drehzahl  $n$ : **1500** min<sup>-1</sup>  
*Speed*

**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

#### Nennndaten / nominal data

**DIG 110 i/4**

Rating  $S_N$ : **1080 kVA**

*p.f.* **0.80**

*Bemessungsleistung*

Leistungsfaktor  $\cos \varphi$ :

Nominal voltage  $U_N$ : **11.00 kV**

Nominal current  $I_N$ : **57 A**

*Bemessungsspannung*

*Bemessungsstrom*

Frequency  $f_N$ : **50 Hz**

Speed  $n$ : **1500 min<sup>-1</sup>**

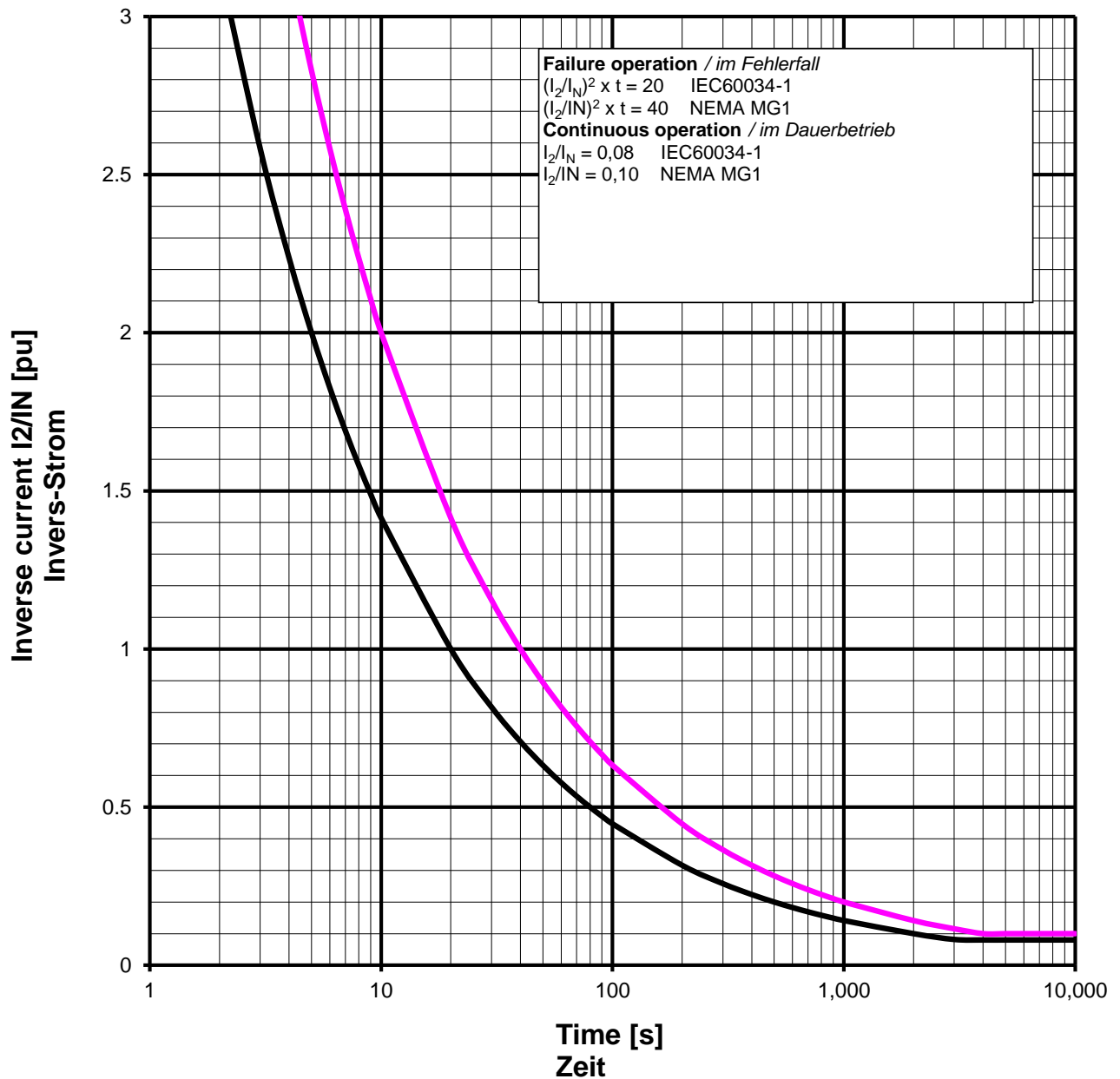
*Frequenz*

*Drehzahl*

Protection: **IP23**

*Schutzart*

#### Inverse current or unbalanced negative sequence current



Remarks / Notizen:

All data according IEC 60034-1, NEMA MG1



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

ING-FCD-0112

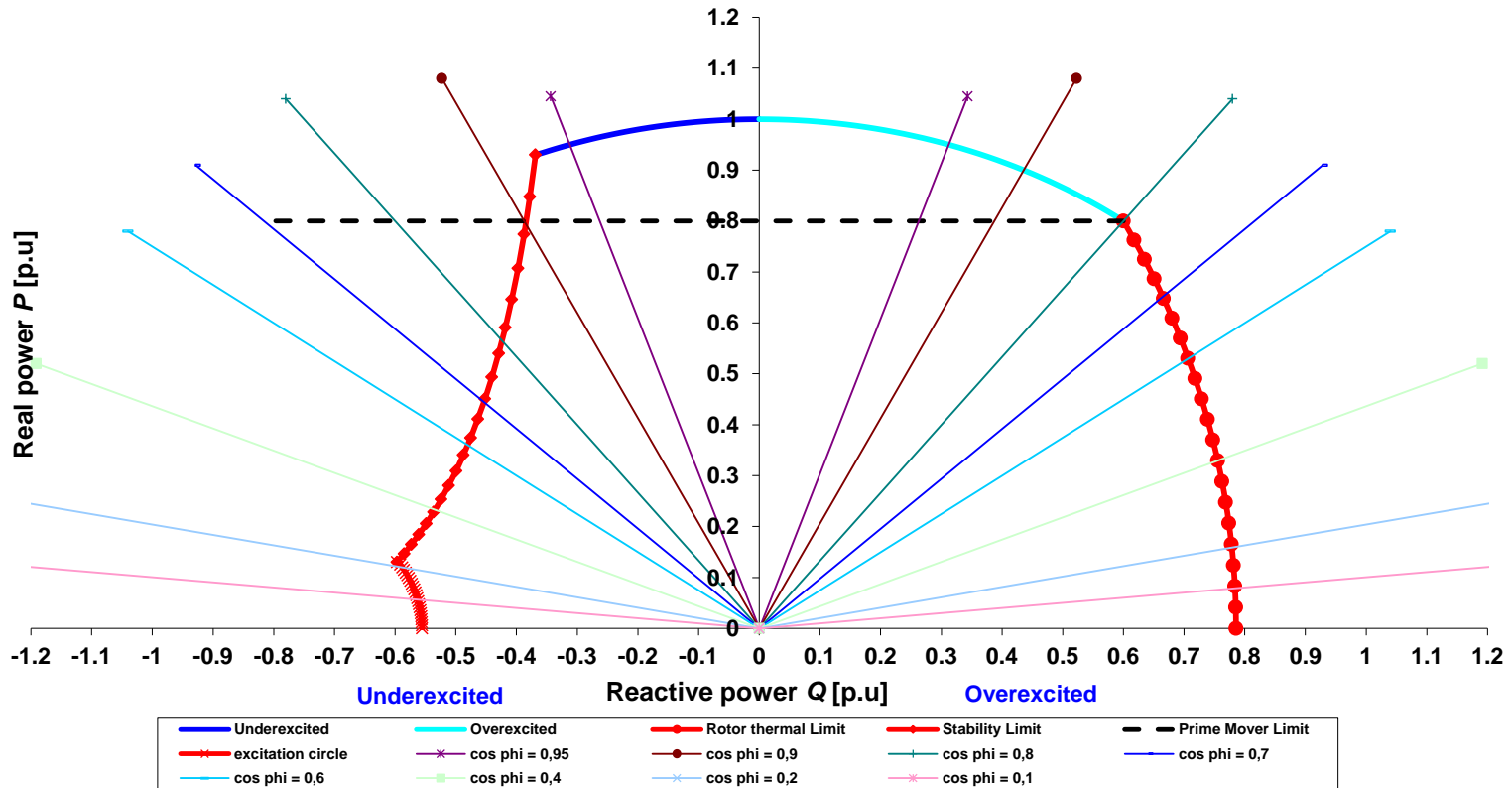
TYPE

DIG 110 i/4

Projekt:

Order Nr.:

### Capability (P-Q) Diagram



Cummins Generator Technologies

Datum / date:

03/10/2013



