

**Technical Data Sheet for AvK-Alternators**

FM 7.3-5

Date:	03/10/13	Customer:	GENERIC DATASHEET only
Project No.:		AvK Reference:	dig120i_4_60_4160

**Object data:**

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

**Generator data:**

Generator:	DIG 120 i/4	Poles:	4	Standards:	IEC 60034
Rated power:	2200 kVA	1760 kWe	1839 kWm		
Power factor:	0.80				
Power at pf 1,0	1778 kVA	1778 kWe	1839 kWm		
Rated voltage:	4.16 kV				
Speed:	1800 1/min				
Frequency:	60 Hz			Voltage range / frequency range:	
Rated current:	305.3 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
		Coolant:		generator:	

		Cooling air vol.:	3.0 m³/s	Cooling water quantity:	n/a
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Moment of inertia (I):	59 kgm²	Weight:	5400 Kg	Losses (environment):	79 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	95,49	95,7	95,6	94,7	91,5
Power factor 0.9	96,02	96,2	96	94,95	91,5
Power factor 1.0	96,54	96,7	96,4	95,2	91,5

**Reactances and time constants**

	unsaturated	saturated		unsaturated	saturated				
$X_d$	2.50	2.25 p.u.	$X_q$	1.25	1.23 p.u.	$T_{d0'}$	3 s	$T_{d0''}$	0.025 s
$X_d'$	0.300	0.300 p.u.	$X_q'$	1.25	1.23 p.u.	$T_{d'}$	0.36 s	$T_{q0'}$	0.3 s
$X_d''$	0.198	0.180 p.u.	$X_q''$	0.198	0.198 p.u.	$T_{d''}$	0.015 s	$T_{q0''}$	0.18939 s
$X_2$	0.208	0.189 p.u.	$X_0$	0.059	0.054 p.u.	$T_a$	0.05 s	$T_{q'}$	0.3 s
$X_{1s}$	n.a.	0.108 p.u.						$T_{q''}$	0.03 s

Short circuit ratio saturated: 0.44	$Z_n$ 7.866 Ohm
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**Short circuit data:**

Initial short circuit current (3-phase):	$I_k''$	1696 A	
Max. peak current (3-phase):	$I_s$	4317 A	
Sustained short circuit current:	$I_k$	916 A	Minimum 3 x rated current for max.10 s

Initial short circuit torque:	$M_{k2}$	84.3 kNm
	$M_{k3}$	50.6 kNm

Max. faulty synchron moment:	$M_f$	181.2 kNm
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Rated kVA torque:	$M_{SN}$	11.67 kNm
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Rated torque	$M_N$	9.34 kNm
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Shaft torque	$M_{Sh}$	9.76 kNm
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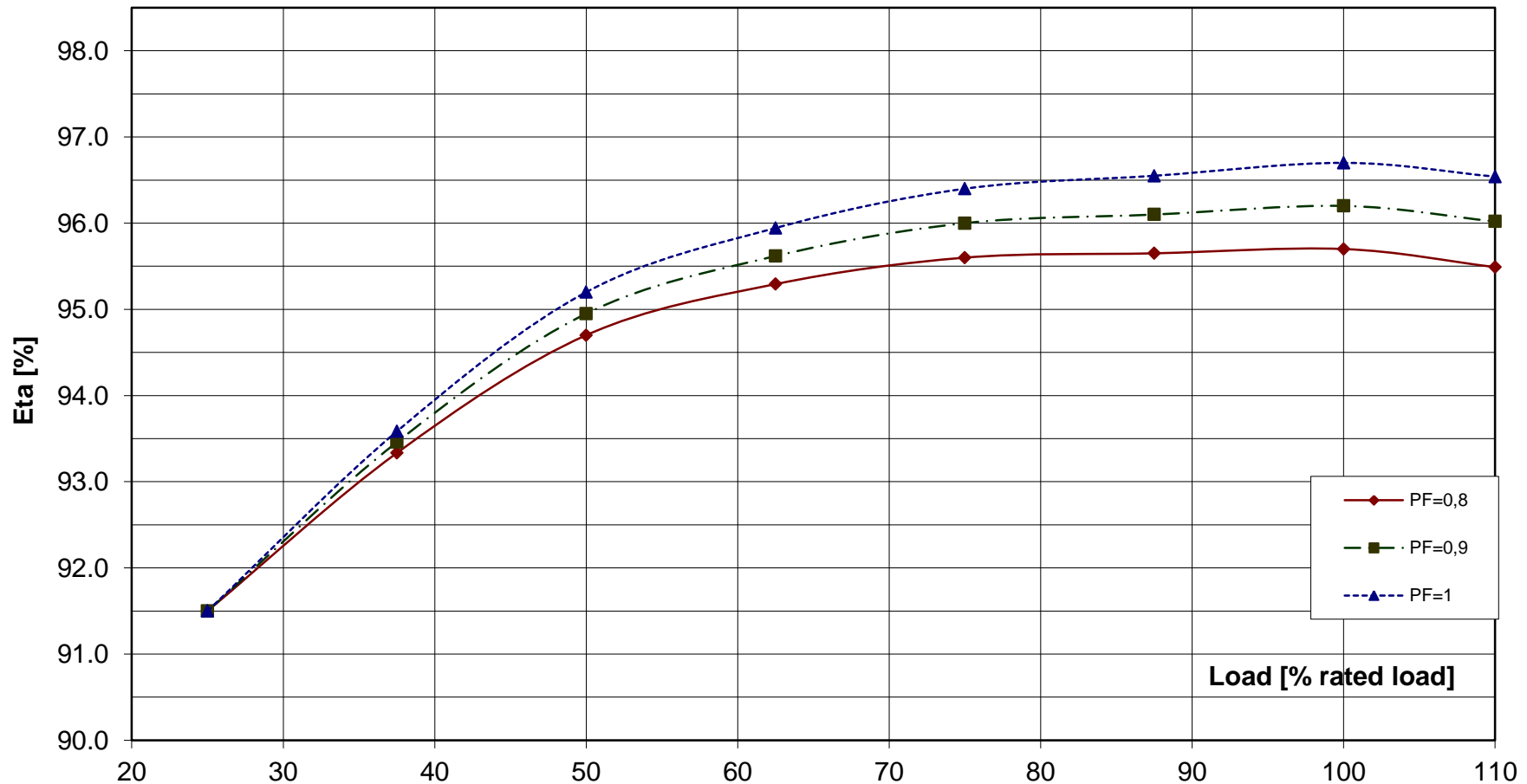
**Load application:**

max. load application: 1100 kVA (corresponds to 50 % from 2200 kVA) for Power factor 0.4 15% transient voltage drop	Power: 2200 kVA Power factor: 0.8 transient voltage drop: -23.1 %
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**Remarks:**

<b>Alternator :</b>	<b>DIG 120 i/4</b>		
Rated output [kVA]	2200	Rated power factor:	0.8
Rated frequency [Hz]	60	Rated speed [rpm]	1800
			Rated voltage [kV]: 4.16

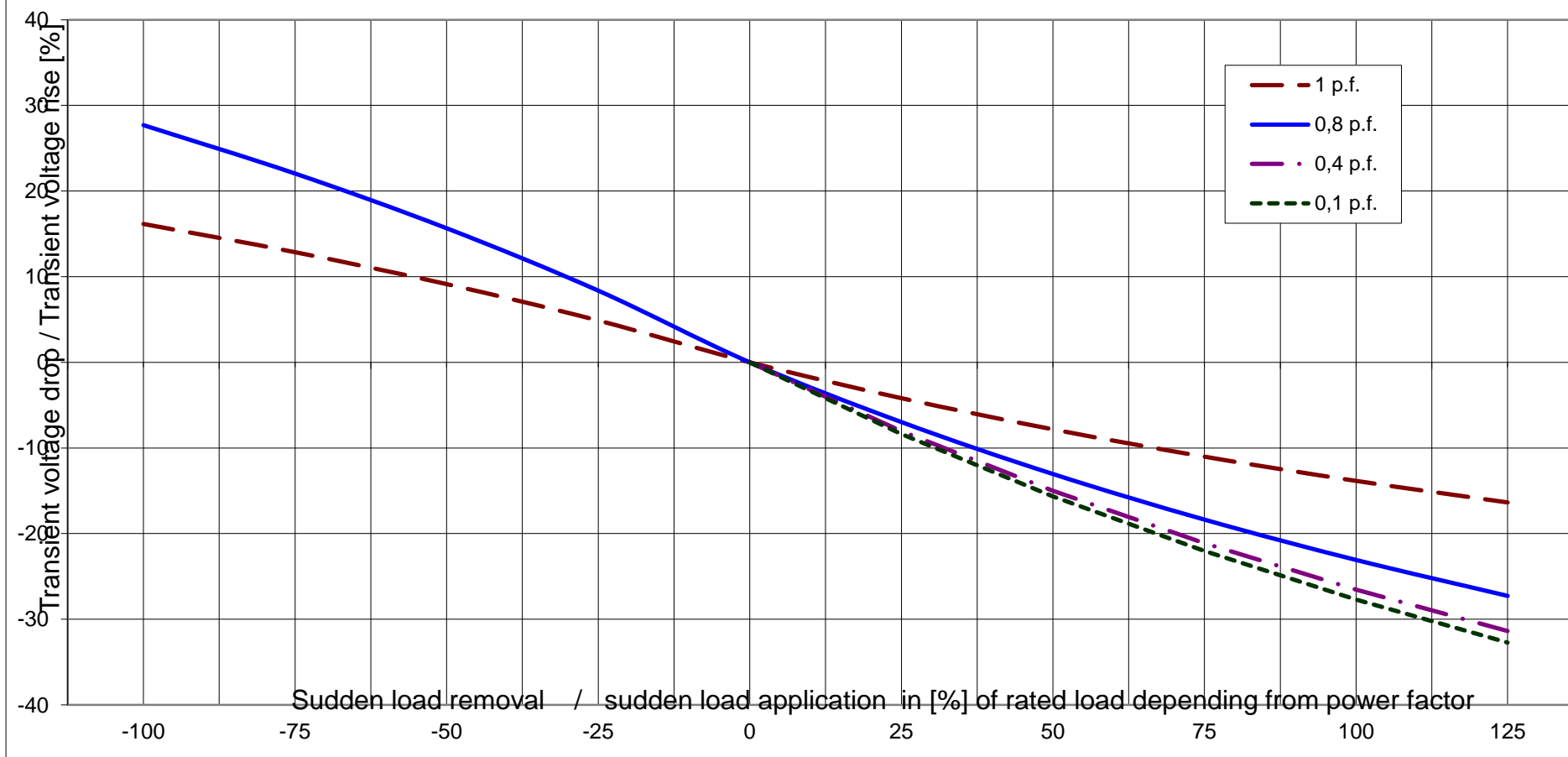
### Wirkungsgrad-Kennlinie - Efficiency Curve



**Alternator : DIG 120 i/4**

Rated output [kVA]	2200	Rated power factor:	0.8	Rated voltage [kV]:	4.16
Rated frequency [Hz]	60	Rated speed [rpm]	1800		

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



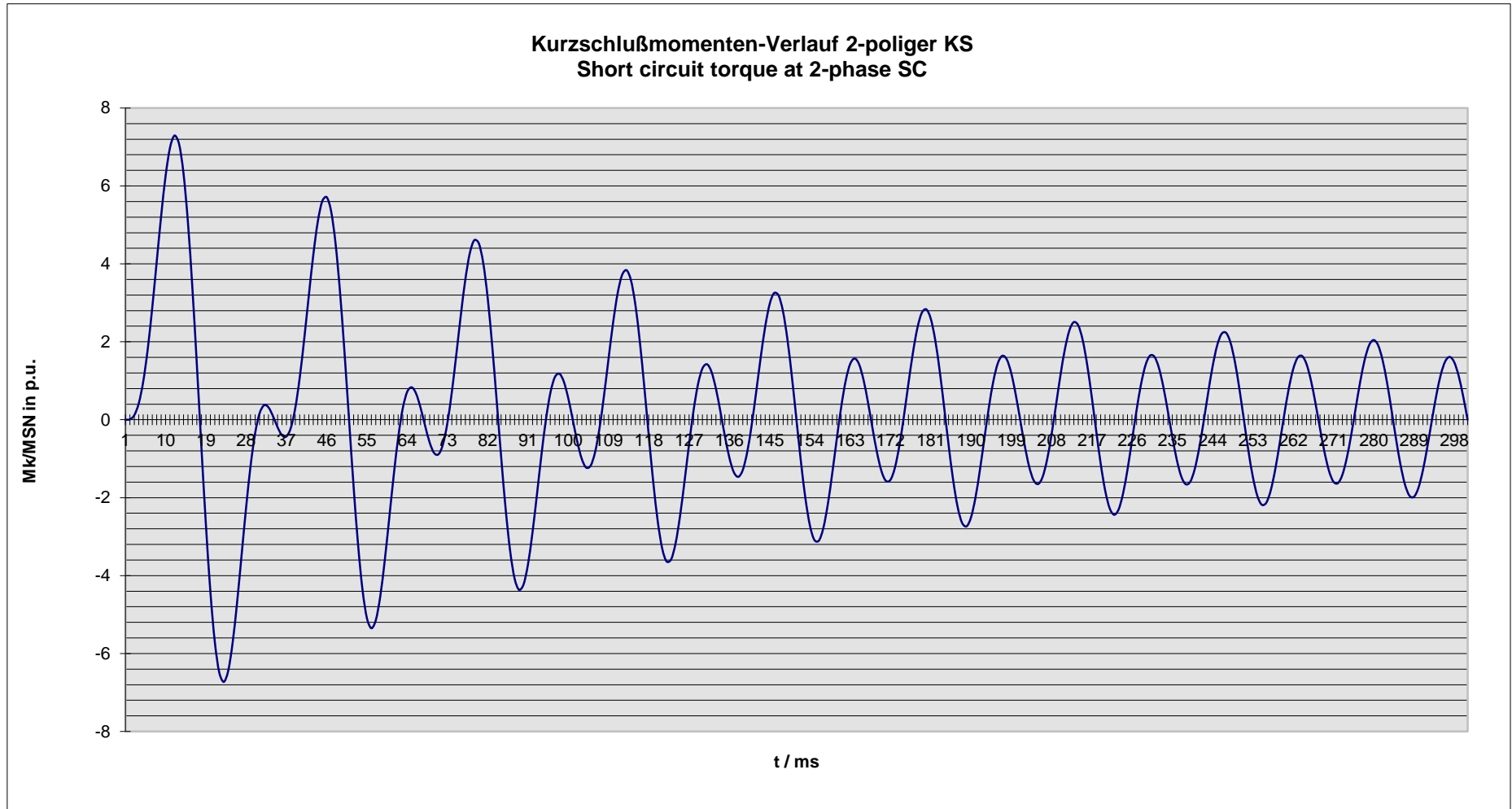


Technisches Datenblatt - Diagramme  
Technical data sheet - Diagrams

ING-FCD-0112

<b>Alternator :</b>	<b>DIG 120 i/4</b>			
Rated output [kVA]	2200	Rated power factor:	0.8	Rated voltage [kV]: 4.16
Rated frequency [Hz]	60	Rated speed [rpm]	1800	MSN related to kVA: 11.67 KNm

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



#### Nenndaten / nominal data

DIG 120 i/4

Leistung  $S_N$ : **2200** kVA

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

Rating

p.f.

Spannung  $U_N$ : **4.16** kV

Strom  $I_N$ : **305** A

Voltage

Current

Frequenz  $f$ : **60** Hz

Drehzahl  $n$ : **1,800** min<sup>-1</sup>

Frequency

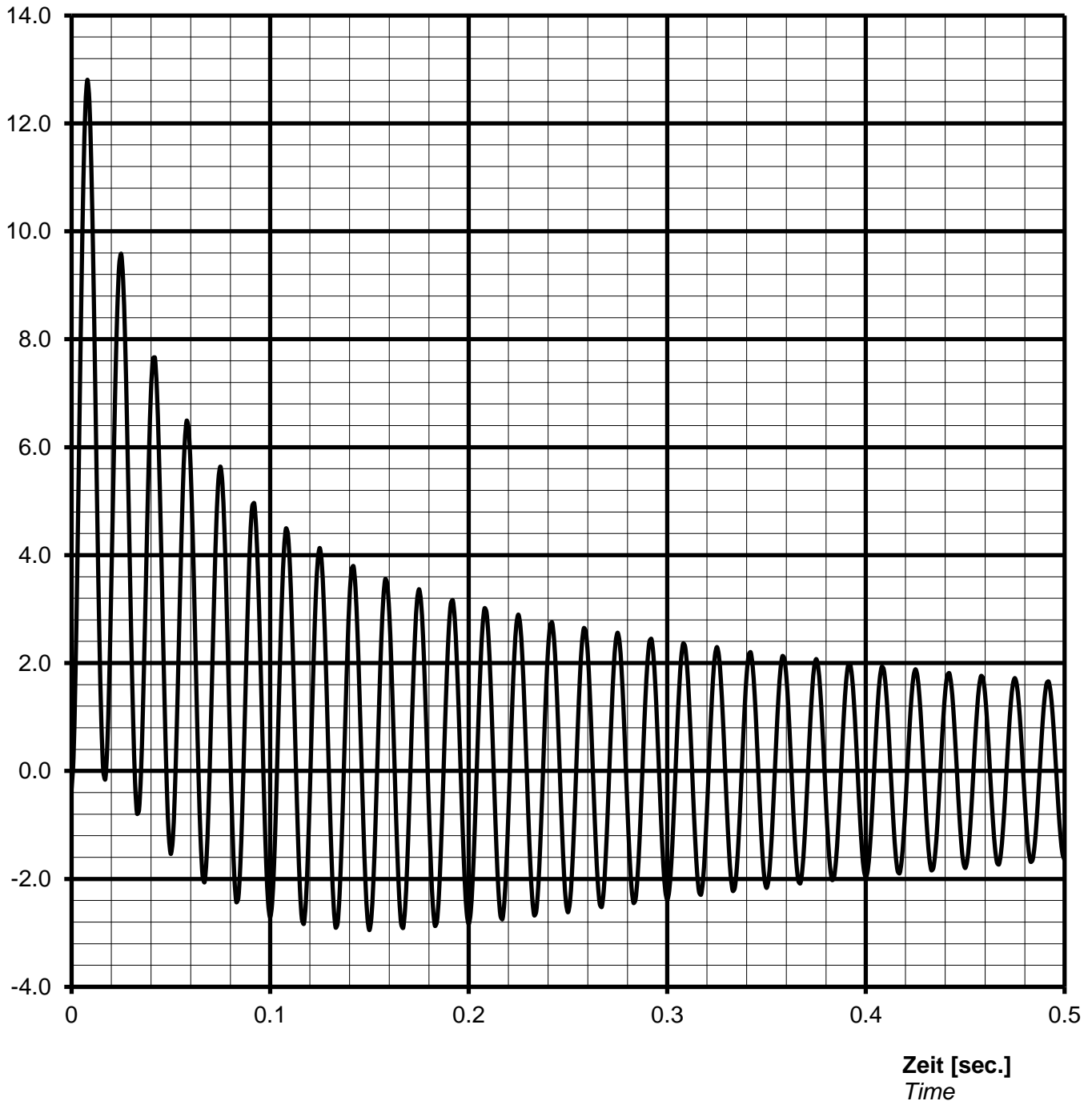
Speed

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

$I_{\text{peak}} =$  **3911** A or **12.81** p.u.

**Nenn Daten / nominal data**

**DIG 120 i/4**

Leistung  $S_N$ : **2200** kVA

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

Rating

p.f.

Spannung  $U_N$ : **4.16** kV

Strom  $I_N$ : **305** A

Voltage

Current

Frequenz f: **60** Hz

Drehzahl n: **1800** min<sup>-1</sup>

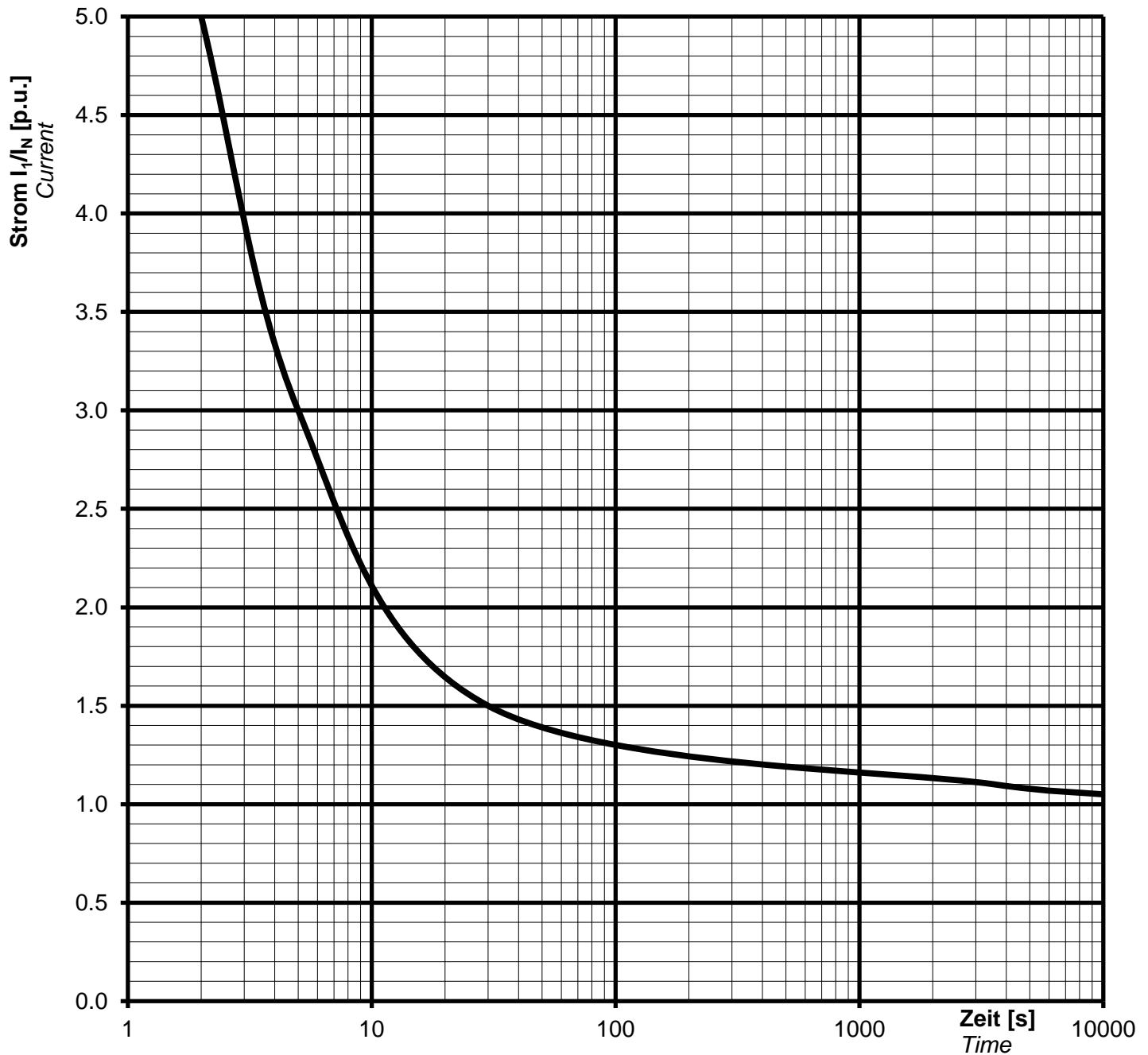
Frequency

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 120 i/4**

Rating  $S_N$ : **2200 kVA**

*p.f.* **0.80**

*Bemessungsleistung*

Leistungsfaktor  $\cos \varphi$ :

Nominal voltage  $U_N$ : **4.16 kV**

Nominal current  $I_N$ : **305 A**

*Bemessungsspannung*

*Bemessungsstrom*

Frequency  $f_N$ : **60 Hz**

Speed  $n$ : **1800 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

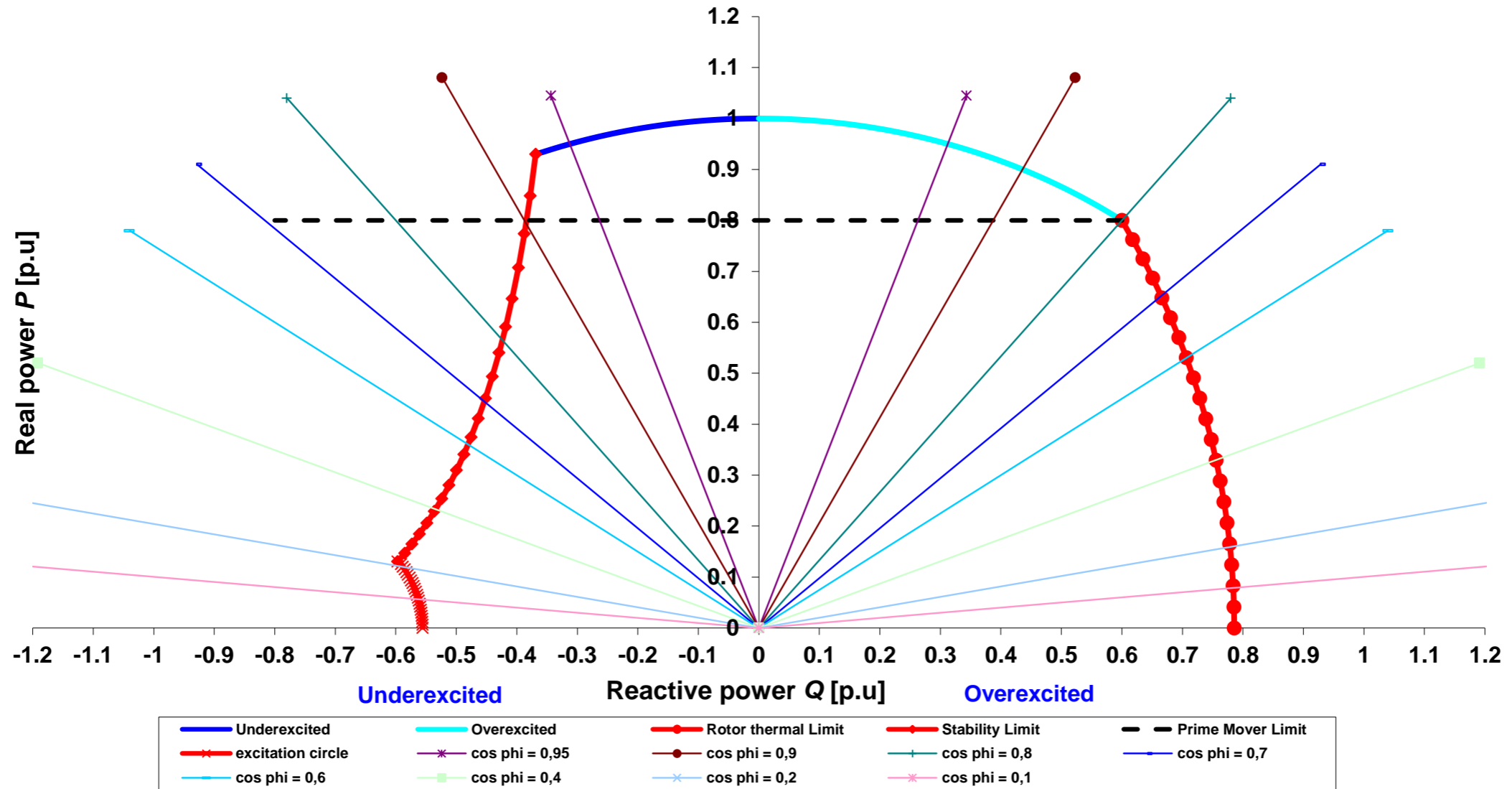
TYPE

DIG 120 i/4

Projekt:

Order Nr.:

### Capability (P-Q) Diagram



Cummins Generator Technologies

Datum / date:

09/10/2013



