

**Technical Data Sheet for AvK-Alternators**

FM 7.3-5

Date:	09/01/14	Customer:	GENERIC DATASHEET only
Project No.:		AvK Reference:	dig156m_10_50_10500_A048N150

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

<b>Generator data:</b>					
Generator:	DIG 156 m/10	Poles:	10	Standards:	IEC 60034
Rated power:	4000 kVA	3200 kWe	3320 kWm		
Power factor:	0.80				
Power at pf 1,0	3230 kVA	3230 kWe	3320 kWm		
Rated voltage:	10.5 kV				
Speed:	600 1/min				
Frequency:	50 Hz			Voltage range / frequency range:	
Rated current:	219.9 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				
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.:	4.0 m³/s	Cooling water quantity:	n/a
Moment of inertia (I):	1000 kgm²	Weight:	18000 Kg	Losses (environment):	120 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	96,22	96,4	96,4	96	93,8
Power factor 0.9	96,7	96,85	96,75	96,3	94,05
Power factor 1.0	97,17	97,3	97,1	96,6	94,3

<b>Reactances and time constants</b>											
	unsaturated		saturated			unsaturated		saturated			
X <sub>d</sub>	1.50	1.35	p.u.	X <sub>q</sub>	0.75	0.74	p.u.	T <sub>d0'</sub>	2.3 s	T <sub>d0''</sub>	0.03784 s
X <sub>d'</sub>	0.280	0.280	p.u.	X <sub>q'</sub>	0.75	0.74	p.u.	T <sub>d'</sub>	0.43 s	T <sub>q0'</sub>	0.5 s
X <sub>d''</sub>	0.204	0.185	p.u.	X <sub>q''</sub>	0.204	0.204	p.u.	T <sub>d''</sub>	0.025 s	T <sub>q0''</sub>	0.18382 s
X <sub>2</sub>	0.213	0.194	p.u.	X <sub>0</sub>	0.062	0.056	p.u.	T <sub>a</sub>	0.08 s	T <sub>q'</sub>	0.5 s
X <sub>1s</sub>	n.a.	0.111	p.u.							T <sub>q''</sub>	0.05 s
Short circuit ratio saturated:	0.74				Z <sub>n</sub>	27.563 Ohm					

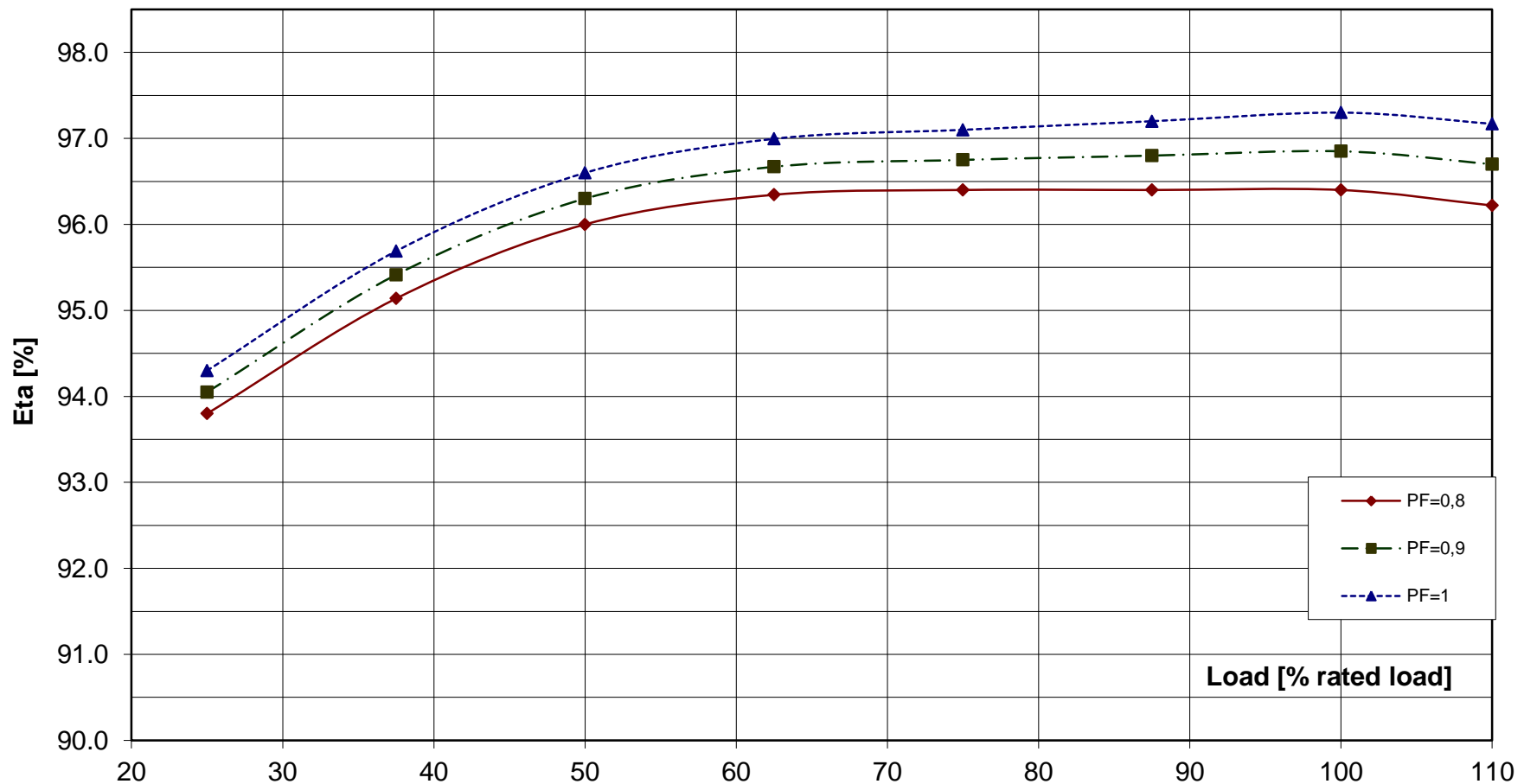
<b>Short circuit data:</b>			
Initial short circuit current (3-phase):	I <sub>k''</sub>	1189 A	
Max. peak current (3-phase):	I <sub>s</sub>	3027 A	
Sustained short circuit current:	I <sub>k</sub>	660 A	
		Minimum 3 x rated current for max.10 s	
Initial short circuit torque:	M <sub>k2</sub>	447.3 kNm	
	M <sub>k3</sub>	268.4 kNm	
Max. faulty synchron moment:	M <sub>f</sub>	961.7 kNm	
Rated kVA torque:	M <sub>SN</sub>	63.67 kNm	
Rated torque	M <sub>N</sub>	50.94 kNm	
Shaft torque	M <sub>Sh</sub>	52.84 kNm	

<b>Load application:</b>	
max. load application: 2143 kVA (corresponds to 53,57 % from 4000 kVA) for Power factor 0.4 15% transient voltage drop	Power: 4000 kVA Power factor: 0.8 transient voltage drop: -21.9 %

**Remarks:**

<b>Alternator :</b>	<b>DIG 156 m/10</b>		
Rated output [kVA]	4000	Rated power factor:	0.8
Rated frequency [Hz]	50	Rated speed [rpm]	600
			Rated voltage [kV]: 10.5

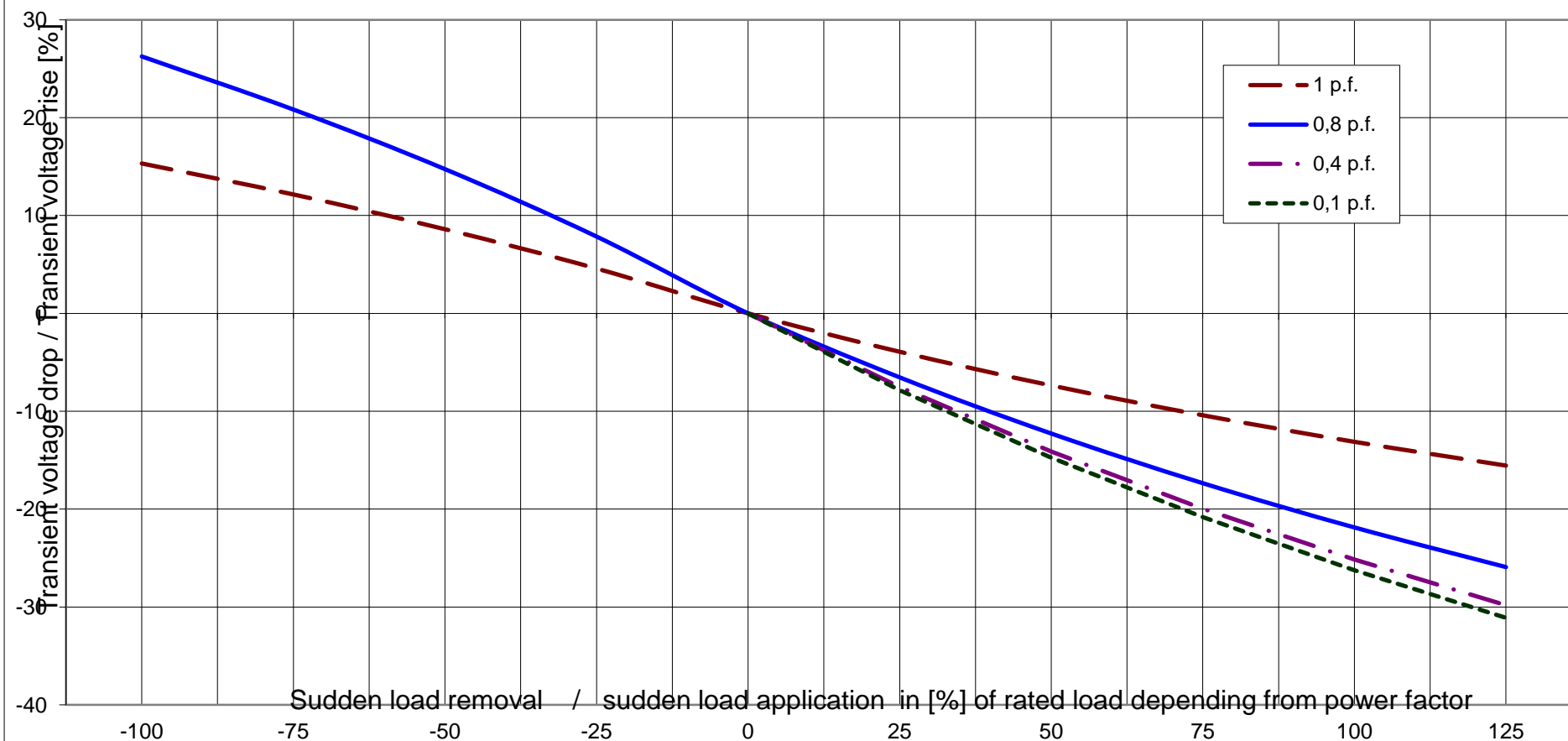
### Wirkungsgrad-Kennlinie - Efficiency Curve



**Alternator : DIG 156 m/10**

Rated output [kVA]	4000	Rated power factor:	0.8	Rated voltage [kV]:	10.5
Rated frequency [Hz]	50	Rated speed [rpm]	600		

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





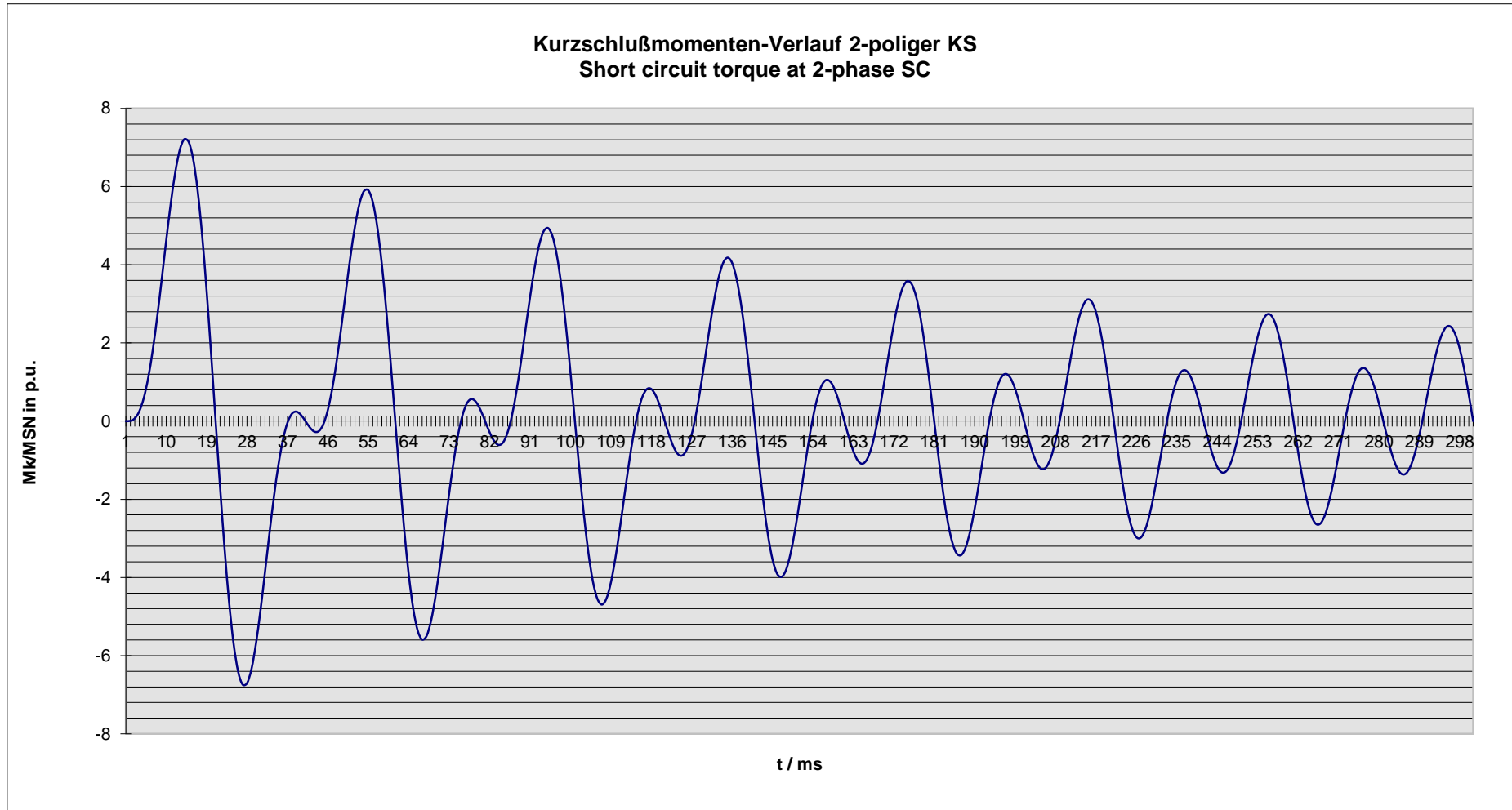
Technisches Datenblatt - Diagramme  
Technical data sheet - Diagrams

ING-FCD-0112

Alternator : **DIG 156 m/10**

Rated output [kVA]	4000	Rated power factor:	0.8	Rated voltage [kV]:	10.5
Rated frequency [Hz]	50	Rated speed [rpm]	600	MSN related to kVA:	63.66 KNm

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



#### Nenn Daten / nominal data

DIG 156 m/10

Leistung  $S_N$ : **4000** kVA

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

Rating

p.f.

Spannung  $U_N$ : **10.50** kV

Strom  $I_N$ : **220** A

Voltage

Current

Frequenz  $f$ : **50** Hz

Drehzahl  $n$ : **600** min<sup>-1</sup>

Frequency

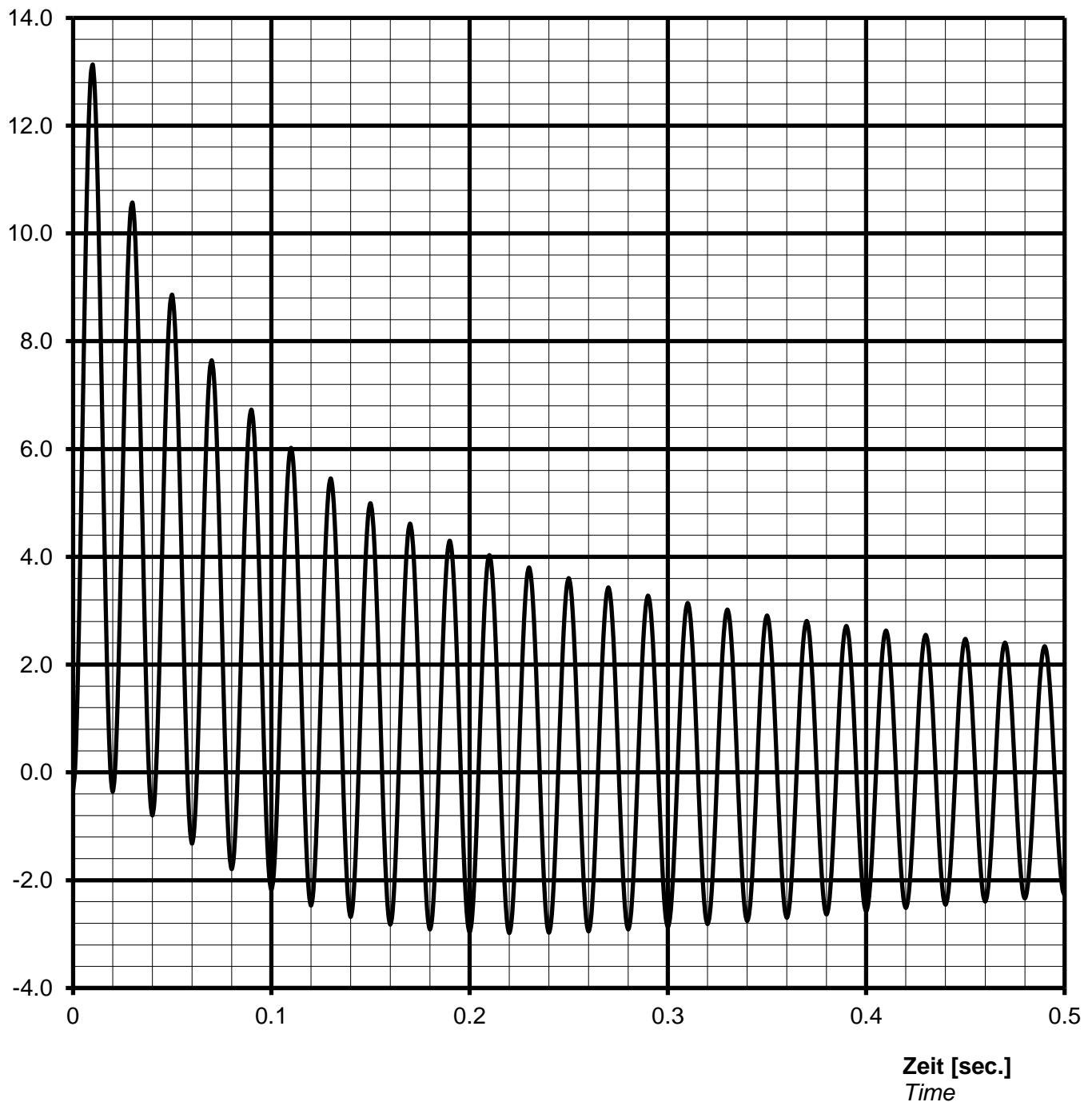
Speed

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  $I_{\text{peak}} =$  **2888 A** or **13.13 p.u.**

#### Nennwerten / nominal data

DIG 156 m/10

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

Rating

p.f.

Spannung  $U_N$ : **10.50** kV

Strom  $I_N$ : **220** A

Voltage

Current

Frequenz f: **50** Hz

Drehzahl n: **600** 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

#### Nennwerten / nominal data

DIG 156 m/10

Rating  $S_N$ : **4000 kVA**

*p.f.* **0.80**

*Bemessungsleistung*

Leistungsfaktor  $\cos \varphi$ :

Nominal voltage  $U_N$ : **10.50 kV**

Nominal current  $I_N$ : **220 A**

*Bemessungsspannung*

*Bemessungsstrom*

Frequency  $f_N$ : **50 Hz**

Speed  $n$ : **600 min<sup>-1</sup>**

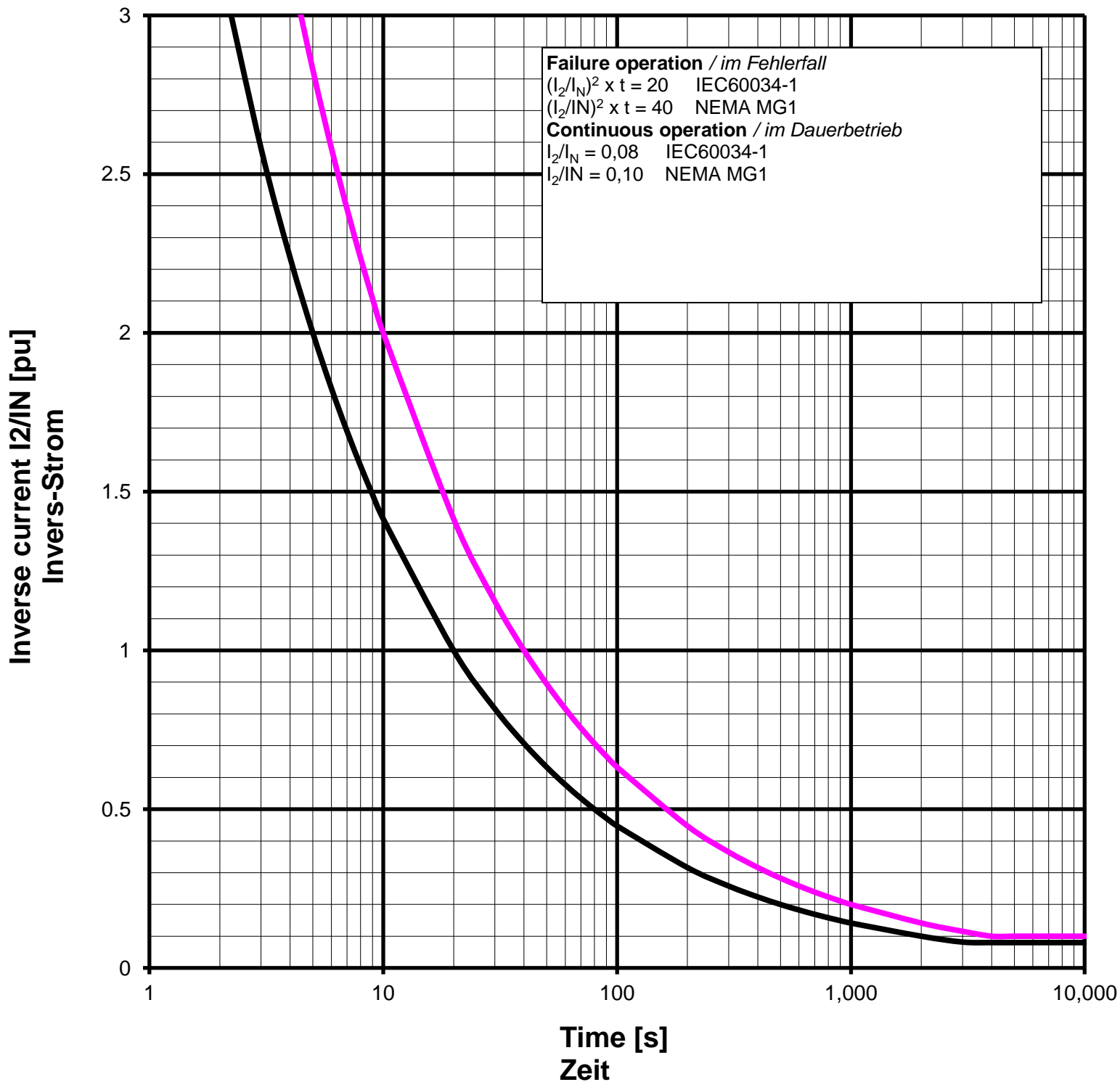
*Frequenz*

*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

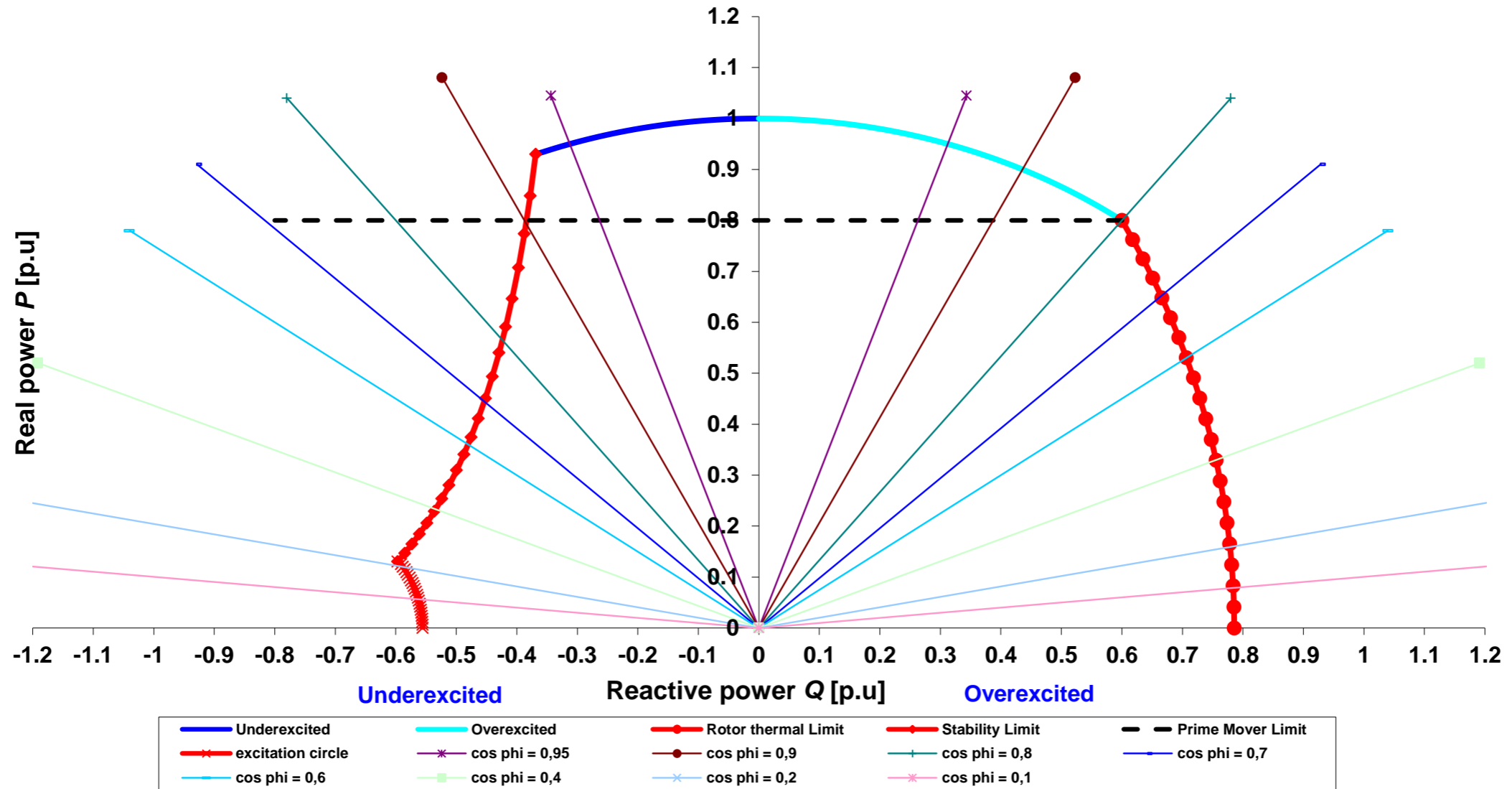
TYPE

DIG 156 m/10

Projekt:

Order Nr.:

Capability (P-Q) Diagram



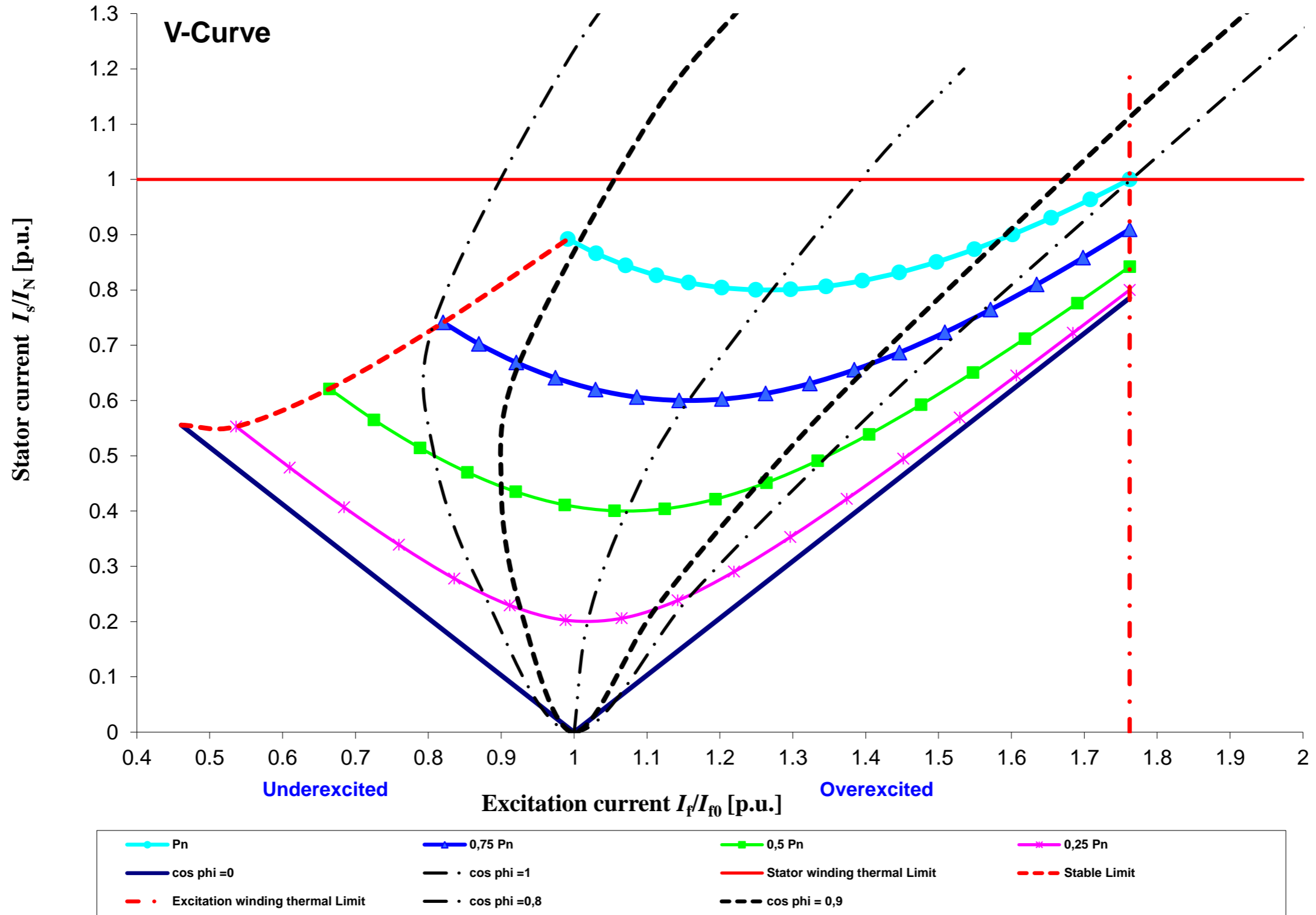
Cummins Generator Technologies

Datum / date:

21/01/2014



TYPE	DIG 156 m/10	Projekt:		Order Nr.:	
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Cummins Generator Technologies	Datum / date:	
	21/01/2014	