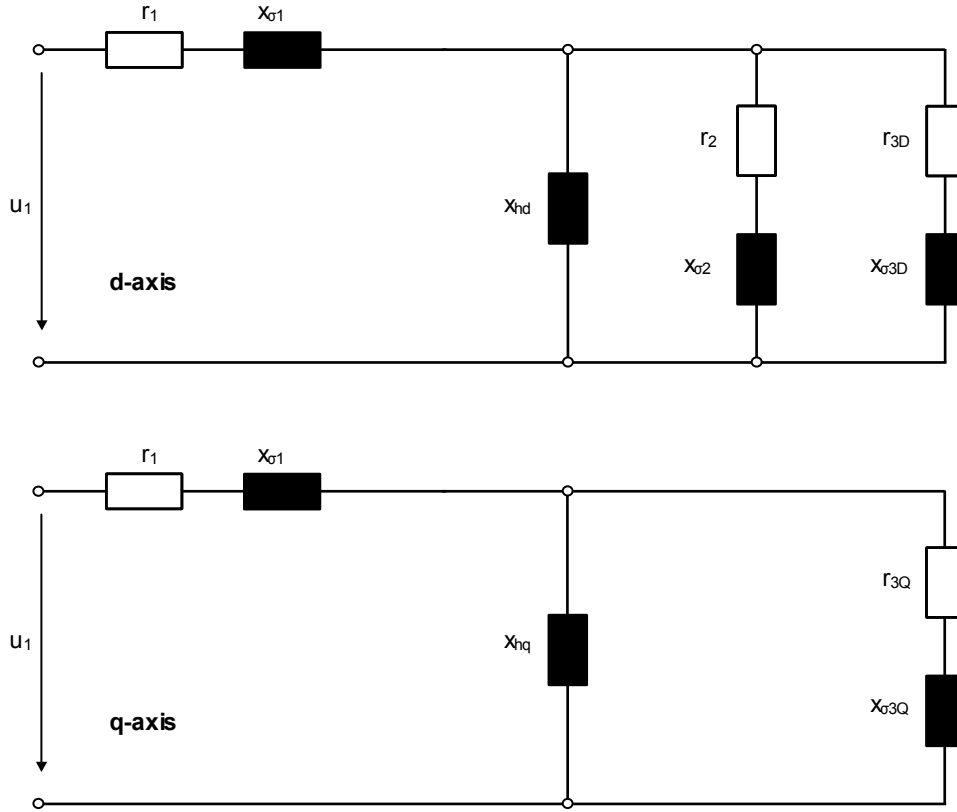


Three-Phase Synchronous Generator with Salient Pole Rotor (Solid Pole)			Order No.		
			Order date	06.01.11	
			Manuf. No.	D1131630101	
Type Unit	1DY1540-5AJ02-Z 1	Cooling System	IC01	Mounting	IM1001
Drive n by	Steam Turbine	Ventilation System	bilat.	Enclosure	IP24
Type Dr.Mach.		Type of Fan	2AX881-22	Ex-Protect	--
Shaft power	10256 kW			Ex-Standard	--
Standard	NEMA, API 546			Insul. System	Micalastic
Rotation	cw			Thermal Class	F
Excitation	brushless			Service Altitude	≤ 1000 m
Type Exc.Mach.	1JG3300-7__06-Z			Over-Speed	2160.0 min⁻¹
				Inertia Motor/Load	0.56 / 0.00 tm²
Remarks					
QS-Performance					
Enclosures					
Sheet : 2 Electrical Data Sheet : 3 Equivalent Circuit Diagram Sheet : 4 Air Gap Torque Pulsation During Sudden Short Circuit Sheet : 5 Efficiency Curve Sheet : 6 Axial Forces due to Rotor Displacement Sheet : 7 Circuit Diagram of Excitation					
IDTLDW	Dep.	FN1	Works No. 1316301	Code SI MAYRIV1	Electrical Data
Siemens AG	Name	Jungelnes	DI1385 K.16 DV-Freigabe		4D3.0180-633515
	Phone/Fax	28062			
	Date	10.02.11			
					Sheet 1 of 7
					242051

Three-Phase Synchronous Generator with Salient Pole Rotor (Solid Pole)				Order No. Order date 06.01.11 Manuf. No. D1131630101	
Type Unit	1DY1540-5AJ02-Z 1	Cooling System IC01 Cooling Circuit sec. prim. Cool. Medium water air Coolant Flow m³/h 7.3 m³/s Inlet Temp. 25 °C 40 °C Ventilation System bilat. Type of Fan 2AX881-22	Mounting IM1001 Enclosure IP24 Ex-Protect -- Ex-Standard -- Insul. System Micalastic Thermal Class F Service Altitude ≤ 1000 m Over-Speed 2160.0 min⁻¹ Inertia Motor/Load 0.56 / 0.00 tm²		
Drive n by Type Dr.Mach.	Steam Turbine				
Shaft power Standard	10256 kW NEMA, API 546				
Rotation Excitation	cw brushless				
Type Exc.Mach.	1JG3300-7 06-Z				
Operating Data		Rated Point			
Output Voltage	kVA V	11764	4160	λ	
Range	% ±	5 / 5			/
Frequency	Hz	60			/
Range	% ±	2 / 2			/
Current	A	1633			
Speed	min ⁻¹	1800.0			
Power Factor		0.85			
Exc. Voltage MM (120 °C)	V				
Exc. Current MM	A	1071			
Aux. Exc. Voltage EM (°C)	V	47			
Aux. Exc. Current EM	A	7.3			
Cooling Temperature sec./prim.	°C	25 / 40			/
Stator Winding Temperature	°C	≤ 125	(ETD)		/
Field Winding Temperature	°C	≤ 120	(R)		
Duty Type		S1			
Remarks					
Efficiency			Losses at Rated Load		
Load	P.F. = 0.85	P.F. = 1.0	x Bearing Friction kW x Windage kW x Core kW x I ² R _{DC} Stator. 95 °C kW x I ² R _{DC} Rotor 95 °C kW x Additional kW x Excitation kW Separated Fan Power kW		
1.00	97.5 % *				
0.75	97.2 % *				
0.50	96.4 % *				
x Marked Losses are included in the Efficiency					
Resistances, Reactances				Time Constants	
Ref. Impedance	ZN = 1.471 Ω	unsaturated		saturated	
Ref. Temperature	95 °C	xdu	1.36 p.u.	xdg	1.20 p.u.
		xd'u	0.27 p.u.	xd'g	0.21 p.u.
xs1	0.14 p.u.	r1	5.30 ‰	xd"u	0.22 p.u.
xs2	0.13 p.u.	r2	0.90 ‰	xd"g	0.19 p.u.
		xqu	0.73 p.u.	xqg	p.u.
		xq"u	0.33 p.u.	xq"g	0.21 p.u.
xs b	p.u.	xp	p.u.	x0g	0.085 p.u.
		x2	0.27 p.u.	x2g	0.20 p.u.
				Ref. Temperature 95 °C	
				TD0'	4.0 s
				TG	0.20 s
				TD'	0.76 s
				TD0"	0.007 s
				TQ0"	0.020 s
				TD"	0.005 s
				TQ"	0.005 s
				T(3K)	0.30 s
				T(2K)	0.50 s
Magnetic Forces		Short Circuit		Unbalanced load	
Axial	FMP 178 kN	Short circuit ratio	I _{K0} /I _N 0.83 p.u.	cont. operation	I ₂ /I _N 8 %
Excentric	CM(N=0) 13 kN/mm CM(N=NN) kN/mm	Sudden sc torque (3-ph)	6.7 p.u.	fault conditions	(I ₂ /I _N) ² *t 20 s
		Sudden sc torque (2-ph)	8.8 p.u.		
		Ref. Values		Voltage regulation	
		Rated current	I _N 1633 A	Full-load rejection	
		Rated torque	M _N 62.4 kNm	Voltage rise ΔU =	0.3 % 0.2 %
				at p.f. =	0.85 1.0
Remarks:					
* Specified values without tolerance; + Specified values with tolerance acc. to standard; calculated values without mark					
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Siemens AG	Name Jungelnes	DI1385 K.16 DV-Freigabe		4D3.0180-633515	242051
	Phone/Fax 28062				
	Date 10.02.11				

Basic circuit diagram of a 3 phase synchronous machine

$P_N = 11764 \text{ kW}$ $F_N = 60 \text{ Hz}$ $M_N = 62.4 \text{ kNm}$
 $U_{N1} = 4160 \text{ V}$ $N_N = 1800.0 \text{ min}^{-1}$
 $I_{N1} = 1633 \text{ A}$



Base value of motor impedance 1.471 Ω ; Reference temperature 95 °C

Synchronous resistances			Air gap reactances			Leakage reactances		
	unsaturated	saturated		unsaturated	saturated		unsaturated	saturated
r1	5.30 ‰		xhd	1.21 p.u.	1.06 p.u.	xσ1	0.14 p.u.	
r2	0.90 ‰		xhq	0.59 p.u.		xσ2	0.13 p.u.	
r3D	217 ‰	62.5 ‰				xσ3D	0.29 p.u.	0.081 p.u.
r3Q	286 ‰	91.7 ‰				xσ3Q	0.29 p.u.	0.073 p.u.

Time constants					
TG	0.20 s	TQ''0	0.020 s	T(3K)	0.30 s
TD'0	4.0 s	TQ''	0.005 s	T(2K)	0.50 s
TD'	0.76 s				
TD''0	0.007 s				
TD''	0.005 s				

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Air Gap Torque Pulsation during Sudden Short-Circuit

$P_N = 11764 \text{ kW}$ $M_N = 62.4 \text{ kNm}$ $N_N = 1800.0 \text{ min}^{-1}$

Air Gap Torque vs. Time during Three-Phase-Sudden Short-Circuit

$$m(t) = M_N \cdot m_{K(3)} \cdot [\exp(-t/T_G - t/T_{K(3)}) \cdot \sin(\omega \cdot t)] \quad [\text{kNm}]$$

$m_{K(3)} = 6.7 \text{ p.u.}$ $T_{K(3)} = 0.30 \text{ s}$ $T_G = 0.20 \text{ s}$

Air Gap Torque vs. Time during Line-to-Line-Sudden Short-Circuit

$$m(t) = M_N \cdot m_{K(3)} \cdot [\exp(-t/T_G - t/T_{K(2)}) \cdot \sin(\omega \cdot t) - 0.5 \cdot \exp(-2t/T_{K(2)}) \cdot \sin(2 \cdot \omega \cdot t)] \quad [\text{kNm}]$$

$m_{K(3)} = 6.7 \text{ p.u.}$ $T_{K(2)} = 0.50 \text{ s}$ $T_G = 0.20 \text{ s}$

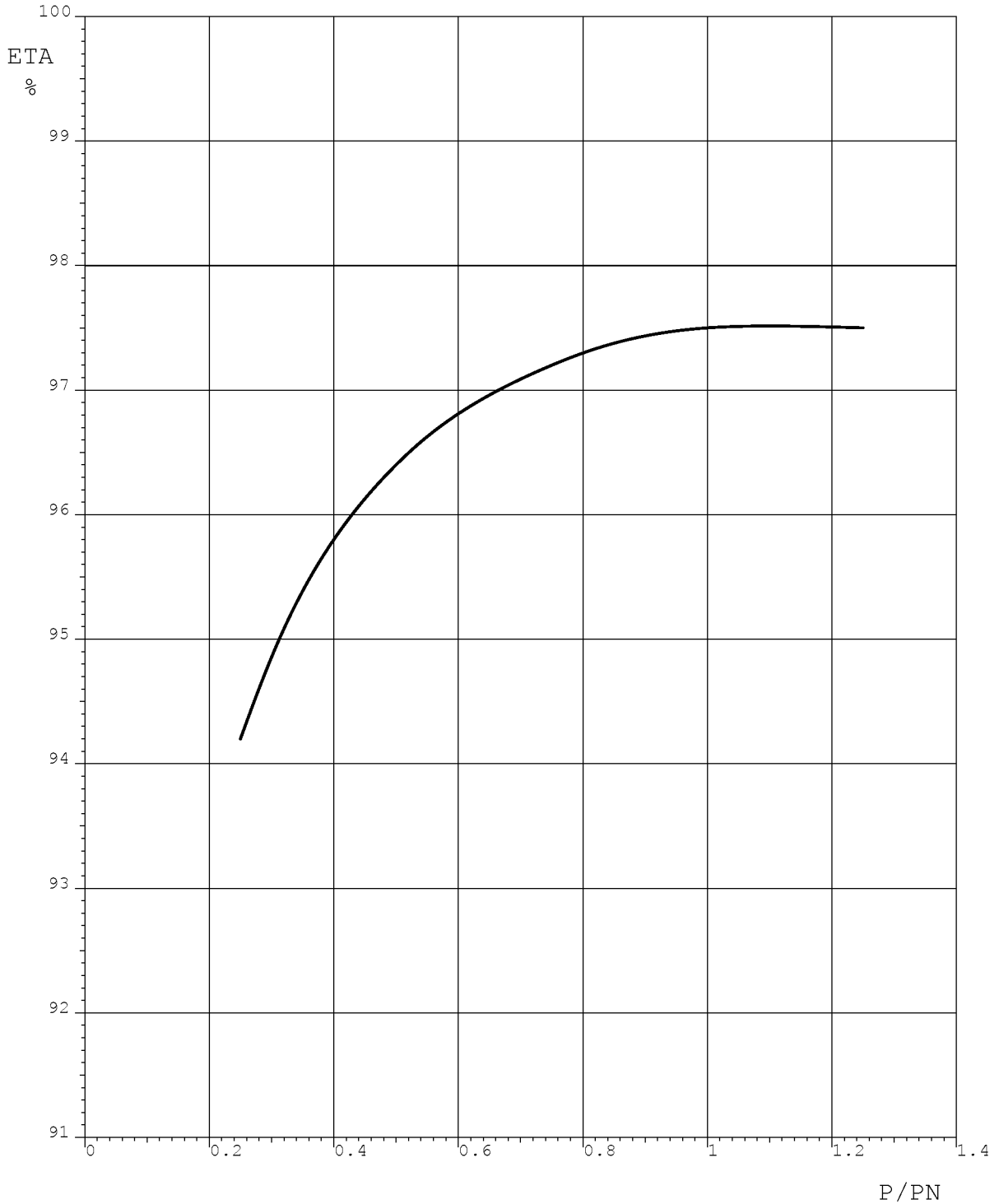
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Siemens AG	I DT LD DW	Dep.	FN1	Works No. 1316301 Code SI MAYRIV1	Electrical Data	Sheet 4 of 7
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		Phone/Fax	28062	DI1385 K.16 DV-Freigabe	4D3.0180-633515	242051
		Date	10.02.11			

EFFICIENCIES (GUARANTEED VALUES)

SN = 11764. KVA UN = 4160. V IN = 1633. A
 FN = 60.0 HZ NN = 1800.0 RPM P.F. = 0.850

———— AT RATED POWER FACTOR

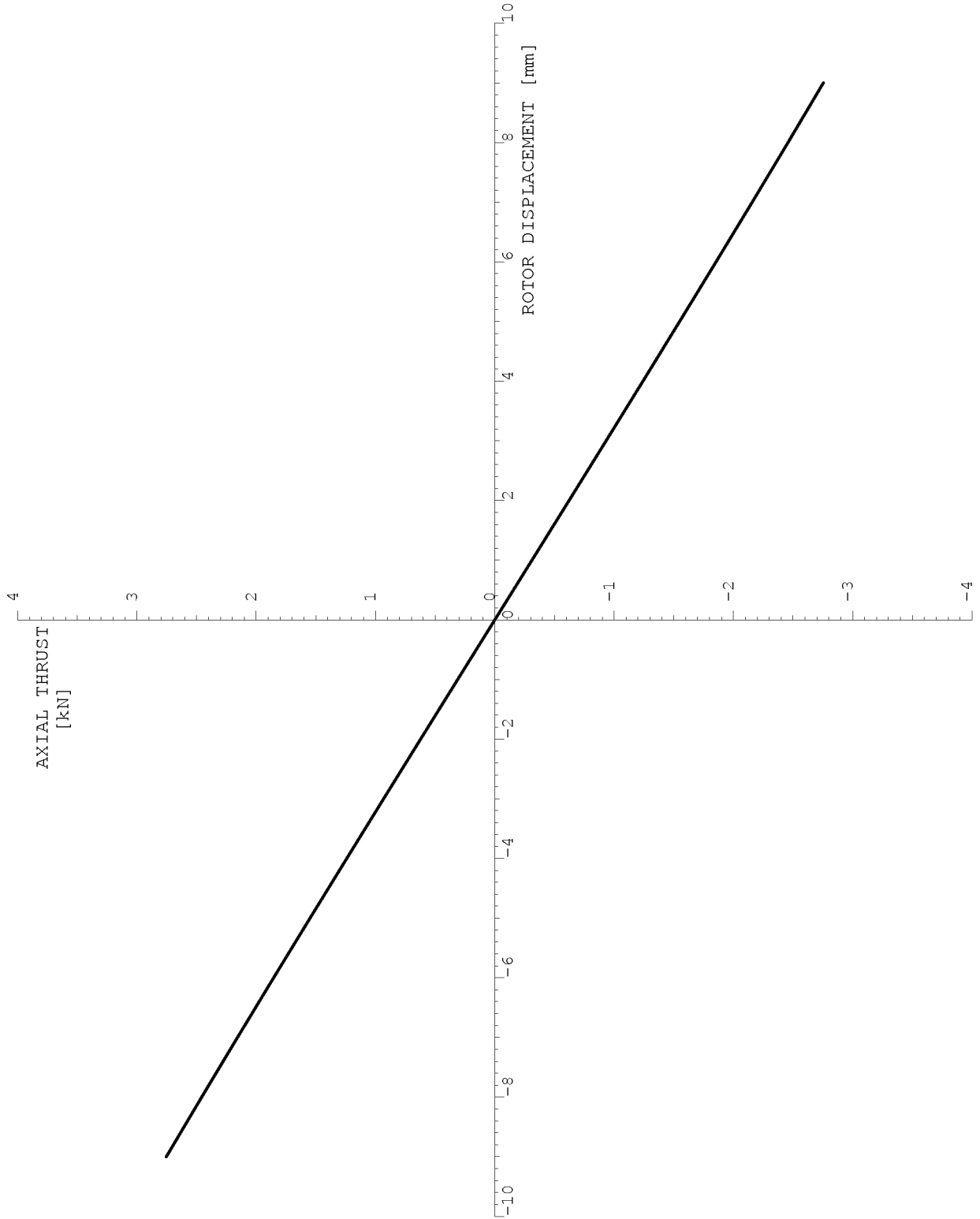


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IDTLDW Siemens AG	Dep.	FN1	Works No. 1316301 Code SI MAYRIV1	Electrical Data	Sheet 5 of 7
	Name	Jungelnes			
	Phone/Fax	28062	DI1385 K.16 DV-Freigabe	4D3.0180-633515	242051
	Date	10.02.11			

AXIAL THRUST BY ROTOR DISPLACEMENT FROM MAGN. CENTRE

SN = 11764. KVA UN = 4160. V IN = 1633. A
 FN = 60.0 HZ NN = 1800.0 RPM P.F. = 0.850

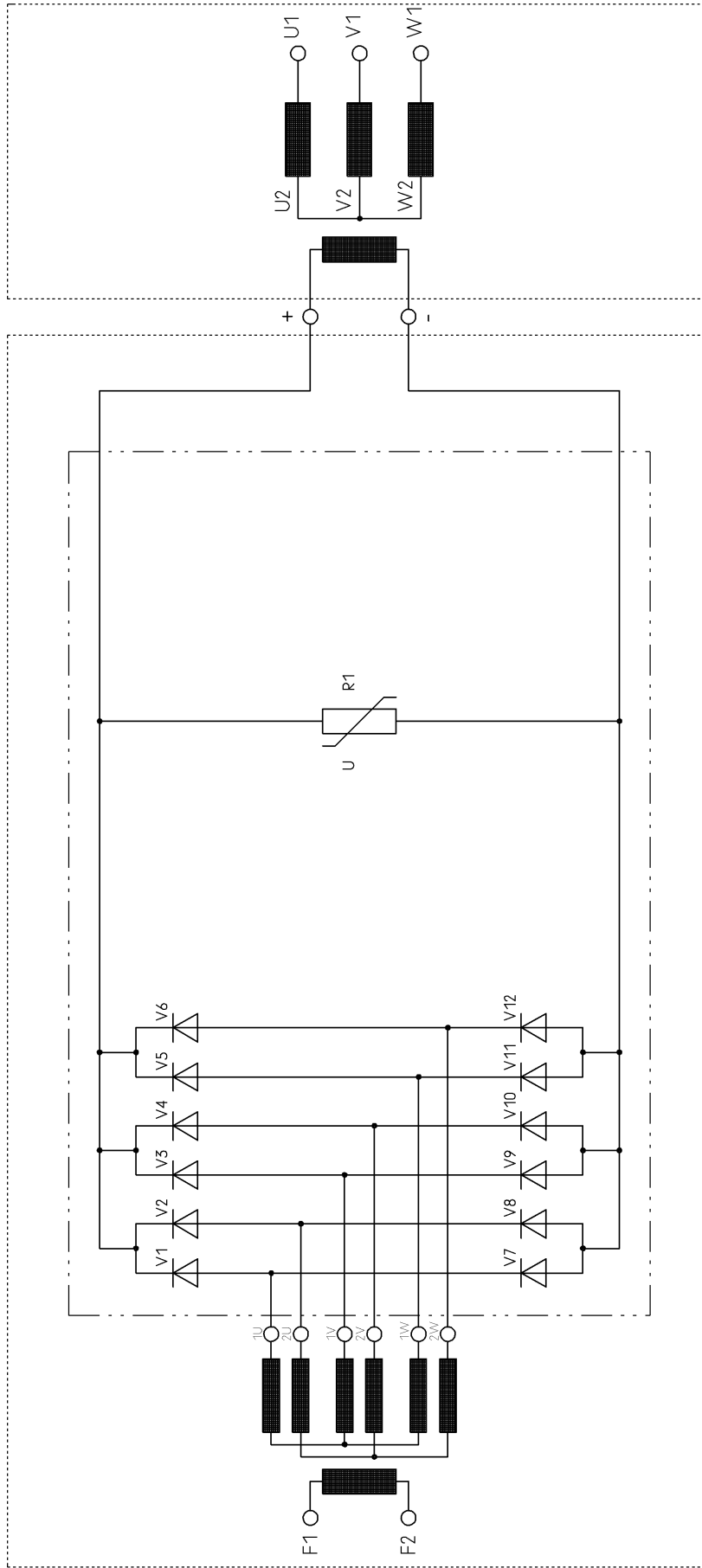


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	Date	10.02.11			

Hauptmaschine
Main machine

Erregermaschine
Exciter



Gleichrichterrad
Rectifier wheel

Bezeichnung	Bezeichnung
Element	Designation
V1 - V12	Siliziumdiode / Silicon diode
R1	Varistor-Schutzwiderstand / Protective resistor

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