



THREE-PHASE SYNCHRONOUS GENERATOR

TCU168F

Datasheet For 4 Poles - 50Hz @ 1500rpm / 60Hz @ 1800rpm

Ambient Temperature	40 °C	Excitation	Brushless	Short Circuit Current Capacity (with PMG)	≥300%
Temperature Rise	125 °C	Winding Pitch	2 / 3	Method of Cooling	IC01
Service Duty	Continuous	Power Factor	0.8	Direction of Rotation	Counter-clockwise
Phase	3	Insulation Class	Class H	Maximum Over-speed	2250 rpm
Pole	4	Waveform : TIF	<50	Degree of Protection	IP21
Voltage Regulation	+/- 0.5%	Waveform : THF	<2%	Radio interference	Class B Group 1
AVR Model	ETC-A1	Altitude	≤1000 m.a.s.l	Total Harmonic Content	< 3% - At no load

Electrical and Mechanical Characteristic

Frequency	Hz	50			60				
		1500			1800				
Round per minute	rpm								
Voltage (Y Connection) - Series Star	V	380	400	415	380	416	440	460	480
Voltage (YY Connection) - Parallel Star	V	190	200	208	190	208	220	230	240
Voltage (Δ Connection) - Series Delta	V	220	230	240	220	240	254	266	277
Voltage (ΔΔ Connection) - Parallel Delta	V	110	115	120	110	120	127	133	138
Rated power at Class H (125 °C) temperature rise	kVA	21.3	22.5	21.5	21.3	23.4	25.0	26.0	27.0
	kW	17	18	17.2	17	18.7	20	20.8	21.6
Efficiency at Class H (P.F.=0.8)	4/4%	83.4	83.5	83.6	82.7	82.9	83.1	83.3	83.5
	3/4%	84.6	84.7	84.8	84.0	84.2	84.4	84.6	84.8
	2/4%	83.9	84	84.1	83.3	83.5	83.7	83.9	84.1
Efficiency at Class H (P.F.=1.0)	4/4%	86.5	86.6	86.7	86.0	86.2	86.4	86.6	86.8
	3/4%	87.8	87.9	88.0	87.4	87.6	87.8	88.0	88.2
	2/4%	87.1	87.2	87.3	86.7	86.9	87.1	87.3	87.5

Reactance (%) at Class H

	Kcc	0.3750	0.3930	0.4430	0.3130	0.3410	0.3560	0.3740	0.3930
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X _d	2.6642	2.5460	2.2600	3.1968	2.9322	2.8052	2.6713	2.5459
Quadrature axis synchronous reactance unsaturated	X _q	1.5799	1.5098	1.3402	1.8957	1.7388	1.6635	1.5841	1.5098
Direct axis transient reactance saturated	X' _d	0.1377	0.1316	0.1168	0.1653	0.1516	0.1450	0.1381	0.1316
Direct axis subtransient reactance saturated	X'' _d	0.1319	0.1260	0.1119	0.1582	0.1451	0.1388	0.1322	0.1260
Quadrature axis subtransient reactance saturated	X'' _q	0.1742	0.1665	0.1478	0.2091	0.1918	0.1835	0.1747	0.1665
Zero sequence reactance unsaturated	X ₀	0.0459	0.0439	0.0389	0.0551	0.0505	0.0483	0.0460	0.0439
Leakage reactance	X _L	0.1048	0.1001	0.0889	0.1257	0.1153	0.1103	0.1051	0.1001
Negative sequence reactance saturated	X ₂	0.1530	0.1463	0.1298	0.1836	0.1684	0.1611	0.1535	0.1463

Open circuit time constant (sec.)	T' _{do}	0.3570							
Short-circuit transient time constant (sec.)	T' _d	0.0160							
Subtransient time constant (sec.)	T'' _d	0.0104							
Armature time constant (sec.)	T _α	0.0810							
No load excitation current	io(A)	0.6			0.6				
Full load excitation current	ic(A)	2			1.9				
Full load excitation voltage	uc(V)	50			49				
Stator Winding Resistance (20°C)	ohm	0.4536							
Rotor Winding Resistance (20°C)	ohm	0.6497							
Exciter Stator Resistance (20°C)	ohm	21.6							
Exciter Rotor Phase resistance	ohm	0.04131							
Cooling air requirement	m ³ /sec	0.071			0.09				

Configuration	Single Bearing	Double Bearing
Type of Construction	B2 - SAE	IM B34
Inertia (J) [kgm ²]	0.151	0.196
Total Weight	124	127
Drive end bearing / Lubrication	Not supply	6309 C3-2Z / Prelubricated - sealed for life
Non-drive end bearing / Lubrication	6306 C3-2Z / Prelubricated - sealed for life	
Recovery time - sec.	0.5	
Stator winding	DOUBLE LAYER CONCENTRIC	
Number of Terminal	12	
Rotor	with damping cage	
Overload	110% rated load for 1 hour	

STANDARD COMPLIANCE - IEC 60034-1; CEI 2-3; BS 4999-5000; VDE 0530; NF 51-100,111; OVE M-10, NEMA MG 1.22.

Data and Technical Specification are subject to change in order to update or improve the products, without prior notice