



THREE-PHASE SYNCHRONOUS GENERATOR

TCU168E

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	18.8	20.0	19.0	18.8	20.6	22.0	23.0	24.0
	kW	15	16	15.2	15	16.5	17.6	18.4	19.2
Efficiency at Class H (P.F.=0.8)	4/4%	82.5	82.6	82.8	81.9	82.0	82.2	82.4	82.6
	3/4%	83.6	83.7	83.9	83.0	83.1	83.3	83.5	83.7
	2/4%	83.0	83.1	83.3	82.5	82.6	82.8	83.0	83.2
Efficiency at Class H (P.F.=1.0)	4/4%	85.6	85.7	85.9	85.2	85.3	85.5	85.7	85.9
	3/4%	86.8	86.9	87.1	86.4	86.5	86.7	86.9	87.1
	2/4%	86.1	86.2	86.4	85.9	86.0	86.2	86.4	86.6

Reactance (%) at Class H

Short-circuit ratio	Kcc	0.3780	0.3920	0.4400	0.3150	0.3430	0.3600	0.3760	0.3920
Direct axis synchronous reactance unsaturated	Xd	2.6484	2.5496	2.2501	3.1778	2.9148	2.7811	2.6623	2.5496
Quadrature axis synchronous reactance unsaturated	Xq	1.5578	1.4996	1.3235	1.8692	1.7144	1.6358	1.5659	1.4996
Direct axis transient reactance saturated	X'd	0.1434	0.1380	0.1218	0.1720	0.1578	0.1505	0.1441	0.1380
Direct axis subtransient reactance saturated	X''d	0.1374	0.1323	0.1167	0.1648	0.1512	0.1443	0.1381	0.1323
Quadrature axis subtransient reactance saturated	X''q	0.1768	0.1702	0.1502	0.2121	0.1946	0.1857	0.1777	0.1702
Zero sequence reactance unsaturated	X0	0.0454	0.0437	0.0386	0.0545	0.0500	0.0477	0.0456	0.0437
Leakage reactance	X _L	0.1099	0.1058	0.0934	0.1319	0.1210	0.1154	0.1105	0.1058
Negative sequence reactance saturated	X2	0.1571	0.1512	0.1335	0.1885	0.1729	0.1650	0.1579	0.1512

Open circuit time constant (sec.)	T'do				0.3360				
Short-circuit transient time constant (sec.)	T'd				0.0160				
Subtransient time constant (sec.)	T''d				0.0098				
Armature time constant (sec.)	T _α				0.0073				
No load excitation current	io(A)	0.6			0.6				
Full load excitation current	ic(A)	2.1			2				
Full load excitation voltage	uc(V)	50			49				
Stator Winding Resistance (20°C)	ohm				0.6285				
Rotor Winding Resistance (20°C)	ohm				0.6138				
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]	0.124	0.147
Total Weight	117	120
Drive end bearing / Lubrication	Not supply	6309 C3-2Z / Pre-lubricated - sealed for life
Non-drive end bearing / Lubrication	6306 C3-2Z / Pre-lubricated - 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