



THREE-PHASE SYNCHRONOUS GENERATOR

TCU228G

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-1	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	85.0	90.0	85.0	85.0	92.5	100.0	102.5	108.0
	kW	68	72	68	68	74	80	82	86.4
Efficiency at Class H (P.F.=0.8)	4/4%	89.1	89.2	89.3	89.2	89.4	89.6	89.8	90
	3/4%	89.8	89.9	90.0	90.0	90.2	90.4	90.6	90.8
	2/4%	89.5	89.6	89.7	89.6	89.8	90.0	90.2	90.4
Efficiency at Class H (P.F.=1.0)	4/4%	91.3	91.4	91.5	91.4	91.6	91.8	92.0	92.2
	3/4%	92.0	92.1	92.2	92.2	92.4	92.6	92.8	93
	2/4%	91.8	91.9	92.0	91.8	92.0	92.2	92.4	92.6

Reactance (%) at Class H

	Kcc	0.3258	0.3412	0.3886	0.2715	0.2992	0.3094	0.3297	0.3409
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X _d	3.0693	2.9330	2.5734	3.6829	3.3419	3.2317	3.0331	2.9330
Quadrature axis synchronous reactance unsaturated	X _q	1.7424	1.6650	1.4609	2.0907	1.8971	1.8346	1.7218	1.6650
Direct axis transient reactance saturated	X' _d	0.1967	0.1880	0.1650	0.2361	0.2142	0.2071	0.1944	0.1880
Direct axis subtransient reactance saturated	X'' _d	0.1695	0.1620	0.1421	0.2034	0.1846	0.1785	0.1675	0.1620
Quadrature axis subtransient reactance saturated	X'' _q	0.1873	0.1790	0.1571	0.2248	0.2040	0.1972	0.1851	0.1790
Zero sequence reactance unsaturated	X ₀	0.0356	0.0340	0.0298	0.0427	0.0387	0.0375	0.0352	0.0340
Leakage reactance	X _L	0.1172	0.1120	0.0983	0.1406	0.1276	0.1234	0.1158	0.1120
Negative sequence reactance saturated	X ₂	0.1779	0.1700	0.1492	0.2135	0.1937	0.1873	0.1758	0.1700

Open circuit time constant (sec.)	T' _{do}	0.9340							
Short-circuit transient time constant (sec.)	T' _d	0.0480							
Subtransient time constant (sec.)	T'' _d	0.0082							
Armature time constant (sec.)	T _α	0.0131							
No load excitation current	io(A)	0.45			0.45				
Full load excitation current	ic(A)	1.9			1.8				
Full load excitation voltage	uc(V)	45			43				
Stator Winding Resistance (20°C)	ohm	0.0802							
Rotor Winding Resistance (20°C)	ohm	0.7054							
Exciter Stator Resistance (20°C)	ohm	17.66							
Exciter Rotor Phase resistance	ohm	0.05509							
Cooling air requirement	m ³ /sec	0.256			0.307				

Configuration	Single Bearing	Double Bearing
Type of Construction	B2 - SAE	IM B34
Inertia (J) [kgm ²]	1.04	0.99
Total Weight	294	310
Drive end bearing / Lubrication	Not supply	6315 C3-2Z / Prelubricated - sealed for life
Non-drive end bearing / Lubrication	6310 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