



THREE-PHASE SYNCHRONOUS GENERATOR

TCU188CS

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	26.0	27.5	26.0	26.0	28.5	30.0	32.0	33.0
	kW	20.8	22	20.8	20.8	22.8	24	25.6	26.4
Efficiency at Class H (P.F.=0.8)	4/4%	84.4	84.5	84.6	84.1	84.2	84.4	84.6	84.8
	3/4%	85.6	85.7	85.8	85.5	85.6	85.8	86.0	86.2
	2/4%	84.9	85	85.1	84.7	84.8	85.0	85.2	85.4
Efficiency at Class H (P.F.=1.0)	4/4%	87.6	87.7	87.8	87.5	87.6	87.8	88.0	88.2
	3/4%	88.8	88.9	89.0	88.9	89.0	89.2	89.4	89.6
	2/4%	88.2	88.3	88.4	88.2	88.3	88.5	88.7	88.9

Reactance (%) at Class H

	Kcc	0.3773	0.4000	0.4500	0.3144	0.3440	0.3654	0.3741	0.3953
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X _d	2.6504	2.5300	2.2222	3.1802	2.9068	2.7370	2.6732	2.5300
Quadrature axis synchronous reactance unsaturated	X _q	1.3839	1.3210	1.1603	1.6605	1.5177	1.4291	1.3958	1.3210
Direct axis transient reactance saturated	X' _d	0.2022	0.1930	0.1695	0.2426	0.2217	0.2088	0.2039	0.1930
Direct axis subtransient reactance saturated	X'' _d	0.1812	0.1730	0.1520	0.2175	0.1988	0.1872	0.1828	0.1730
Quadrature axis subtransient reactance saturated	X'' _q	0.2148	0.2050	0.1801	0.2577	0.2355	0.2218	0.2166	0.2050
Zero sequence reactance unsaturated	X ₀	0.0440	0.0420	0.0369	0.0528	0.0483	0.0454	0.0444	0.0420
Leakage reactance	X _L	0.1205	0.1150	0.1010	0.1446	0.1321	0.1244	0.1215	0.1150
Negative sequence reactance saturated	X ₂	0.1980	0.1890	0.1660	0.2376	0.2171	0.2045	0.1997	0.1890

Open circuit time constant (sec.)	T' _{do}	0.4500							
Short-circuit transient time constant (sec.)	T' _d	0.0300							
Subtransient time constant (sec.)	T'' _d	0.0056							
Armature time constant (sec.)	T _α	0.0111							
No load excitation current	io(A)	0.6			0.55				
Full load excitation current	ic(A)	1.8			1.7				
Full load excitation voltage	uc(V)	32			30				
Stator Winding Resistance (20°C)	ohm	0.304							
Rotor Winding Resistance (20°C)	ohm	0.7406							
Exciter Stator Resistance (20°C)	ohm	16.51							
Exciter Rotor Phase resistance	ohm	0.07234							
Cooling air requirement	m ³ /sec	0.119			0.143				

Configuration	Single Bearing	Double Bearing
Type of Construction	B2 - SAE	IM B34
Inertia (J) [kgm ²]	0.183	0.202
Total Weight	147	152
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