THREE-PHASE SYNCHRONOUS GENERATOR

TCU188F

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

Ambient Temperature	40 ℃	**Excitation**	Brushless	**Short Circuit Current Capacity (with PMG)**	≥300%
Temperature Rise	125 ℃	**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**				
Round per minute	**rpm**	**1500**			**1800**				
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**	40.0	**42.5**	40.0	40.0	44.0	46.5	50.0	50.0
	kW	32	**34**	32	32	35.2	37.2	40	40
Efficiency at Class H (P.F.=0.8)	**4/4%**	87.2	**87.3**	87.4	86.9	87.0	87.2	87.5	87.7
	3/4%	88.4	**88.5**	88.6	88.2	88.3	88.5	88.8	89
	2/4%	87.9	**88**	88.1	87.6	87.7	87.9	88.2	88.4
Efficiency at Class H (P.F.=1.0)	**4/4%**	90.4	**90.5**	90.6	90.3	90.4	90.6	90.9	91.1
	3/4%	91.6	**91.7**	91.8	91.6	91.7	91.9	92.2	92.4
	2/4%	91.1	**91.2**	91.3	91.1	91.2	91.4	91.7	91.9
Reactance (%) at Class H									
Short-circuit ratio	**Kcc**	0.3694	**0.3850**	0.4406	0.3078	0.3356	0.3550	0.3606	0.3929
Direct axis synchronous reactance unsaturated	**Xd**	2.7073	**2.5960**	2.2699	3.2484	2.9795	2.8167	2.7732	2.5451
Quadrature axis synchronous reactance unsaturated	**Xq**	1.3964	**1.3390**	1.1708	1.6755	1.5368	1.4528	1.4304	1.3127
Direct axis transient reactance saturated	**X'd**	0.1815	**0.1740**	0.1521	0.2177	0.1997	0.1888	0.1859	0.1706
Direct axis subtransient reactance saturated	**X"d**	0.1596	**0.1530**	0.1338	0.1915	0.1756	0.1660	0.1634	0.1500
Quadrature axis subtransient reactance saturated	**X"q**	0.1992	**0.1910**	0.1670	0.2390	0.2192	0.2072	0.2040	0.1873
Zero sequence reactance unsaturated	**X0**	0.0428	**0.0410**	0.0358	0.0513	0.0471	0.0445	0.0438	0.0402
Leakage reactance	**X_L**	0.1001	**0.0960**	0.0839	0.1201	0.1102	0.1042	0.1026	0.0941
Negative sequence reactance saturated	**X2**	0.1794	**0.1720**	0.1504	0.2152	0.1974	0.1866	0.1837	0.1686

Open circuit time constant (sec.)	**T'do**	0.5430	
Short-circuit transient time constant (sec.)	**T'd**	0.0320	
Subtransient time constant (sec.)	**T"d**	0.0069	
Armature time constant (sec.)	**Tα**	0.0126	
No load excitation current	**io(A)**	0.6	0.55
Full load excitation current	**ic(A)**	1.7	1.7
Full load excitation voltage	**uc(V)**	29	29
Stator Winding Resistance (20°C)	**ohm**	0.1294	
Rotor Winding Resistance (20°C)	**ohm**	0.9864	
Exciter Stator Resistance (20°C)	**ohm**	17.14	
Exciter Rotor Phase resistance	**ohm**	0.07475	
Cooling air requirement	**m^3/sec**	0.139	0.167

Configuration	**Single Bearing**	**Double Bearing**
Type of Construction	**B2 - SAE**	**IM B34**
Inertia (J) [kgm2]	0.323	0.317
Total Weight	203	212
Drive end bearing / Lubrication	Not supply	6212 C3-2Z / Prelubricated - sealed for life
Non-drive end bearing / Lubrication	6308 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.